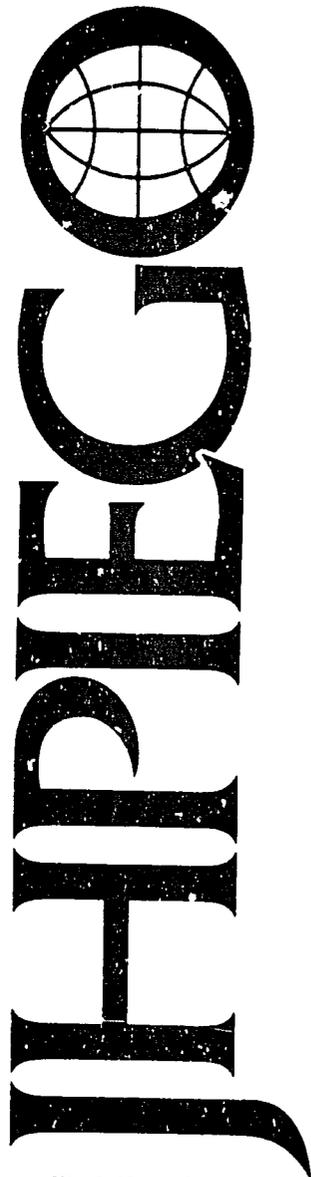


PN.AB4-598



Publications

**GENITAL
TRACT
INFECTION
GUIDELINES**

*FOR
FAMILY PLANNING
SERVICE PROGRAMS*

ACKNOWLEDGEMENTS

The idea for these guidelines grew out of discussions with Drs. A. Latif and O.L. Mbengeranwa during a field trip to Zimbabwe in June 1989. The Zimbabwe Ministry of Health through the Zimbabwe Essential Drugs Action Programme (ZEDAP) has produced a module, "Sexually Transmitted Diseases (STD)," for use by primary health care workers. It provides "... the minimum necessary knowledge for a nurse to manage patients with STDs ..." where even limited diagnostic testing is not available. These guidelines were developed to meet the growing need to provide secondary level providers staffing health care facilities (nurses, midwives and physicians) with additional knowledge and skills regarding the management of sexually transmitted genital tract infections (GTIs).

The JHPIEGO Education Office staff are deeply indebted to Drs. Latif and Mbengeranwa for their ideas and suggestions and to ZEDPA for making available the text and many of the drawings and figures from their STD module. By making use of this material, we were able to format these guidelines along the same lines as the ZEDPA module, thereby building in a certain measure of continuity.

Although writing the guidelines was the responsibility of Noel McIntosh, Mychelle Farmer, Sally Cherry and Barbara Kinzie, other staff at JHPIEGO provided much needed editing and suggestions in preparing initial drafts. In addition, special thanks go to the Directors of JHPIEGO's Regional Training Centers in Egypt (Dr. Roushdi Ammar), Morocco (Dr. M. Tahar Alaoui), the Philippines (Dr. Virgilio Oblepias) and Thailand (Dr. Kobchitt Limpaphayom), who generously gave of their time as reviewers; and to Martha Lynch, Ph.D., and Drs. Marcia Angle and Michael Spence for their time, interest and ideas. Finally, sincere thanks go to Ann Blouse, Stacy Cole and Penelope Riseborough, who directed the word processing and assembly of the manuscript and production of the guidelines.

Financial support for this publication was provided in part by The United States Agency for International Development (USAID) Mission (Cairo, Egypt), and the JHPIEGO Cooperative Agreement DPE-3045-A-00-7004-00. The views expressed in these guidelines are those of the authors and do not necessarily reflect those of USAID.

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JHPIEGO Corporation, February 1991

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PREFACE

Since the concept of sexually transmitted diseases (STDs) was first identified, the spectrum of disease included in this category has expanded greatly. Currently, there are more than twenty different forms of STDs. The magnitude of complications arising from STDs and, in particular, pelvic inflammatory disease (PID) points to an enormous health problem. To address this issue, practical and economical STD control programs to help the greatest number are required. Because family planning (FP) and STD clinical services overlap substantially, during the coming years health care workers who are knowledgeable and skilled in both disciplines will be more effective reproductive health clinicians.

Considerable technical information about STDs currently exists with more on the way. Unfortunately, this information does not always inform health workers as intended because it lacks a practical, understandable format. As a result, many times very little is understood. The trick is to organize existing information in a new form so users can find what they want, when they need it! To achieve this, this manual was designed to supply only the essentials needed to permit clinicians -- physicians, nurses, midwives and paramedics -- to rapidly and confidently diagnose most cases of sexually transmitted genital tract infections. To do so only requires a microscope, a few inexpensive reagents and the willingness of the clinician to assess carefully the client's problem.

These guidelines are intended to serve as a primary reference for medical and paramedical students and postgraduate health professionals learning to diagnose and manage those STDs frequently encountered in the family planning setting. As such, their scope is limited to the management of those STDs causing genital tract infections -- not all STDs. Specifically, information regarding AIDS/ARC (HIV), and Hepatitis B (HBV) is not covered as well as for other STDs rarely encountered in the family planning setting.

The decision not to include detailed diagnostic and treatment strategies for managing human papilloma virus (HPV) and cervical dysplasia (pre-cancerous changes) constitutes a special situation. Although women attending family planning clinics may share some risk factors with women who develop cervical cancer including early age of coitus, high parity and multiple sex partners, they do not constitute a high-yield population for detection of the early pre-cancerous changes (dysplasia) which antedate cervical cancer. This is due, in part, to their young age (vast majority, age 35 years or less) and, as yet, low prevalence of cervical infections with those types of HPV associated with cervical dysplasia. Additional factors which make screening family planning acceptors for cervical dysplasia and/or HPV unsuitable in most developing countries are:

- cost (\$5 to \$15 per Pap test),
- high rate of unreadable smears which need repeating, and
- poor client follow-up.

However, because of the serious consequences of not recognizing this condition in women 35 and over -- more than 500,000 cervical cancer deaths per year with over 90 percent occurring in women living in developing countries -- guidelines for referring women with persistent cervicitis are provided in **Chapter 4: Vaginal Discharge**.

Because the problem-oriented approach more closely approximates clinical practice, the material in the guidelines is organized by client problem (i.e., vaginal discharge, genital ulcer or abdominal pain) rather than by causative agent (microorganism). This method has proved to be particularly useful in developing countries, but can be used in industrialized countries as well. Flowcharts are used wherever feasible as a step-by-step guide to diagnosis and tables summarize the chief clinical features of those STDs causing genital tract infections. The appendices contain detailed descriptions of how to perform the diagnostic tests and interpret the results and a treatment guide.

Potential users of these guidelines include clinicians (physicians, nurses and midwives) staffing secondary and tertiary level health care facilities where equipment and instruments to perform pelvic examinations, obtain the appropriate specimens and examine them microscopically are readily available. Used in this setting these clinicians should be able to adequately diagnose most GTIs seen in the family planning setting and correctly manage the vast majority.

ONE

INTRODUCTION

WHAT ARE GTIS?

GTIs are those **G**ENITAL **T**RACT **I**NFECTIONS (GTIs) caused by a small number of microorganisms which usually are transmitted through sexual contact. GTIs, such as gonorrhea and syphilis, have been around a long time -- thousands of years or more. By contrast, the AIDS virus (HIV) was only discovered in 1983. Moreover, GTIs in both developed and developing countries constitute enormous health problems.

GTIs frequently are encountered in family planning clients and especially in certain high risk groups such as prostitutes and couples where one or both members have other sexual partners. Clients suspected of having a GTI usually present with one of the following problems:

- Vaginal or urethral discharge
- Genital ulcers with or without enlarged glands (buboes)
- Lower abdominal and/or scrotal pain
- Genital skin conditions

If the woman has a vaginal and/or urethral discharge the cause could be:

- Gonorrhea
- Chlamydia
- Trichomonas
- Candida
- Bacterial vaginosis
- Herpes simplex virus

If the client (woman or man) has a genital ulcer with or without swollen nodes (buboes) the cause could be:

- Chancroid
- Syphilis
- Lymphogranuloma venereum (LGV)
- Herpes
- Granuloma inguinale

If there is scrotal or lower abdominal pain, he or she may have:

- Epididymo-orchitis (infection in the testes)
- Pelvic inflammatory disease (PID)

Finally, the client with a genital skin condition may have:

- Condyloma acuminata
- Molluscum contagiosum
- Pediculosis pubis
- Scabies

IMPORTANCE OF GTIS

Currently in developing countries the most neglected area of health care is the management of genital tract infections (GTIs) -- particularly vaginitis, cervicitis and pelvic infection (PID) in women (Dixon-Mueller and Wasserheit, 1991). PID, most frequently a complication of GTIs, has been shown to be an immense problem in developing and developed countries. For example, more than 40% of acute admissions to gynecology wards in Africa are related to PID, with the majority due to Neisseria gonorrhoea or Chlamydia trachomatis. Moreover, in Southeast Asia, where the prevalence of penicillinase-producing Neisseria gonorrhoea (PPNG) strains is high, management of PID has become very difficult (Meheus, 1984 and Wasserheit et al, 1989). High incidence of gonorrhoea is correlated with low fertility both in males and females. The resulting infertility is not only a health problem for the individual; it also can result in social ostracism, the effect of which is particularly severe on women in many developing countries.

Considering the enormous burden of morbidity from sexually transmitted GTIs coupled with the meager resources available, the objective of reducing the incidence of GTIs is unrealistic in most developing countries. However, a realistic aim is to obtain a reduction in the incidence of GTI complications, such as PID, urethral stricture and male and female infertility. This aim can be realized by:

- Attaining good management of clients and their partners with sexually transmitted GTIs at the earliest possible stage of the disease process, (i.e., before the cervicitis or urethritis ascends to become PID in the female or epididymitis in the male)
- Screening and case finding in high-risk groups known to have a high prevalence of GTIs

Because family planning and GTI clinical services overlap substantially, it is important to provide GTI surveillance for FP clients -- even if the likelihood of GTI acquisition is low. Effective surveillance need not require use of complicated protocols which include costly laboratory tests.

Health care providers may provide surveillance for large client populations by just doing the following:

- being aware of the spectrum of GTIs in general,
- being knowledgeable of those GTIs which are particularly common in your population, and
- performing GTI evaluations on clients in whom GTIs are suspected by history or physical exam.

PROBLEM ORIENTED APPROACH TO MANAGING GTIS

During the last 10 years WHO has sponsored several workshops to develop a strategy for management of sexually transmitted GTIs at the primary health care level (Meheus, 1984). Using this approach, simplified problem-solving protocols have been developed. Because at the primary health care level an inexpensive microscope or other simple tests usually are not available, case management of a problem, such as vaginal discharge, is based solely on limited clinical findings. Although field testing of these protocols, which are in the form of flowcharts, has shown them to be far from perfect, at the basic health service level this approach is the only one possible. Furthermore, when one compares the management outlined in these protocols, it is clear that they are a distinct improvement over actual medical practice in most developing countries.

In health care facilities where complete physicals, including peivic examinations, can be done and a microscope may be available, these flowcharts can be refined to provide greater specificity and sensitivity in managing the whole spectrum of sexually transmitted GTIs frequently encountered. Thus, in the above situation, given a microscope and a clinician trained to use it, a wet mount preparation of the vaginal secretions and Gram-stained cervical smear could have been obtained and examined. Depending on the results of direct microscopy of the specimens, the woman would have received specific treatment according to the pathogen(s) identified. Or, as is often the case, if after careful study no pathogens and few or no leukocytes (PMNs) were found on the cervical smear, no treatment would be given. The client in this situation would be told to return for re-evaluation if the "discharge" persists or other symptoms develop.

The use of both bright- and darkfield microscopy to support clinical diagnoses in clients with GTIs is extremely useful, particularly in situations where cultures and other microbiological tests are not available to confirm the diagnosis (Osoba, 1980; Wasserheit et al, 1989; and WHO, 1984). Even in situations where cultures routinely are used, the procedures described in this manual offer the clinician additional information to aid in determining the diagnosis while the client is still in the office (or clinic). This improves the likelihood of:

- providing the correct diagnosis and treatment at the first presentation of the problem,
- minimizing treatment failures, and
- improving compliance.

The effectiveness of using microscopy and other simple tests to diagnose GTIs will be further enhanced if some background data are collected before and at regular intervals after starting a GTI program. Such information can be obtained from well-designed, small-scale epidemiologic studies and should include data on:

- the etiology of infectious cervicitis and urethritis nationally,
- the frequency of concomitant N. gonorrhoea and C. trachomatis in cervicitis and urethritis, and,
- the antibiotic susceptibility pattern of gonococci and prevalence of B-lactamase producers among circulating gonococcal strains.

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TWO

GUIDELINES FOR USING THE MANUAL

BACKGROUND

The purpose of this manual is to:

- familiarize clinicians (physicians, nurses, midwives and paramedics) with the problem-oriented approach to managing clients with GTIs,
- acquaint these clinicians with current, standardized GTI treatment schedules and, most importantly,
- introduce them to several microscopic tests and other simple, inexpensive tests which can detect most pathogens causing GTIs.

The material in this manual has been specifically developed to augment the WHO problem-oriented approach for managing GTIs. To complement this strategy, the simple management protocols (flowcharts) employed at the basic health care level have been modified to provide greater diagnostic accuracy. The importance of having clinicians trained to use these diagnostic tests (e.g., microscopy) is threefold. First, clinics having GTI-trained clinicians can serve as intermediate (secondary level) referral centers for treatment failures referred from the primary health care centers where GTI diagnostic testing ordinarily is not available. Second, because of the increased prevalence of genital infections -- particularly vaginitis and cervicitis -- the safe use of IUDs requires that all clients be screened for GTIs prior to insertion. Finally, not having the ability to identify normal vaginal discharge and diagnose and treat simple vaginitis (e.g., candidiasis or bacterial vaginosis) severely limits IUD use even further.

USING THE MANUAL

Based on the clinical findings (Chapter 3: History and Physical Examination), most clients with GTIs usually will be found to have one or more of the following problems:

- Vaginal discharge (vulvovaginitis, cervicitis, or urethritis)
- Genital ulcers with or without enlarged glands (buboes)
- Lower abdominal and/or scrotal pain
- Genital skin conditions

Identifying the problem area(s) in a symptomatic client is an important first step; it helps focus on the possible causes of the infection.

Determining the cause of a client's symptoms is the next step. In the following Chapters, flowcharts are presented which specifically identify the cause of the infection:

Chapter 4:	Vulvovaginitis: Cervicitis:	Flowchart One Flowchart Two
Chapter 5:	Urethritis:	Flowchart Three
Chapter 7:	Genital Ulcers and Buboos:	Flowchart Four
Chapter 8:	Pelvic Inflammatory Disease:	Flowchart Five
Chapter 9:	Epididymo-orchitis:	Flowchart Six

These flowcharts are based not only on clinical findings but also on results obtained from the microscopic and other simple tests described in **Appendix A: Diagnosis of GTIs**. When correctly performed, these tests can detect the presence of most microorganisms causing GTIs in women and men (Osoba, 1980 and Wasserheit et al, 1989).

To make using and interpreting these flowcharts easier, each is keyed to brief **Diagnostic Tips** discussions. And, as a final diagnostic aid, brief descriptions of each microorganism causing GTIs are presented in **Appendix B: Basic Facts About GTIs**. The material in this appendix is organized to provide:

- ready information on how to recognize a specific GTI (microbiology, clinical features and diagnosis), and
- how to limit the spread of each GTI (incubation period, mode of transmission, contagious period and prevention).

Remember: To get the most out of using this manual, the clinician should prepare a clinical assessment for each client presenting with a possible GTI. This brief, clearly-worded assessment should summarize the clinician's:

- interpretation of the clinical findings (signs and symptoms) and diagnostic tests, and
- any uncertainties in the diagnosis.

It also should include a management plan with a specific listing of the:

- treatment (name of medication, exact dose, frequency and duration of treatment),
- follow-up, and
- plan for contacting (and treating) the client's sexual partner(s), (if indicated).

Once the presumptive diagnosis has been made, specific treatment then can be initiated. In **Appendix C: GTI Treatment Guidelines**, the regimens described are based on current WHO recommendations, using antimicrobial drugs which are considered to be most effective. Although the cost of newer drugs, especially those needed to treat resistant strains of N. gonorrhoea, H. ducreyi (chancroid) and T. vaginalis, is a major obstacle to successfully treating GTIs, the cost of inadequate therapy (including complications, relapse, further spread and selection for antimicrobial resistance) must be weighed against the higher initial cost of the more effective, newer therapies (WHO, 1989). **As a consequence, before using the flowcharts, treatment regimens and the other information provided in this manual, they will need to be reviewed and adapted to the particular conditions in your country.** Factors that need to be considered are:

- local disease patterns,
- basic drugs list,
- personnel, and
- available supplies and equipment.

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World Health Organization (1989). "STD treatment strategies." Programme for Sexually Transmitted Diseases, WHO/VDT/89.447, Geneva.

THREE

HISTORY AND PHYSICAL EXAMINATION

GTIs IN THE FAMILY PLANNING SETTING

All clinicians working in family planning clinics must be familiar with the clinical problems associated with sexually transmitted GTIs. Some clients are asymptomatic and have little or no suspicion that an infection is present. Others will have symptoms and request an evaluation. It is important to identify correctly those clients with GTIs, whether they are symptomatic or not. The best way to do this is to perform a thorough genital tract evaluation on all clients who visit the family planning clinic. Because a thorough examination usually is not possible on all clients, it is important to remember to do at least a GTI screening history on all clients.

GUIDELINES FOR EVALUATING CLIENTS WITH GTIs

- Be sensitive to the sociocultural background of the client and needs for confidentiality.
- Maintain a private place for history-taking and examination. Both are very personal experiences which should be performed with only essential personnel present.
- Avoid being judgmental with your questions or in your tone of voice.
- Allow the client to express his/her concerns regarding contraceptive methods and his/her particular risk of contracting sexually transmitted genital tract infections.
- If a genital tract infection examination is needed, explain to the client exactly what will be done.
- Perform the examination carefully, in order to minimize discomfort and to maximize the ability to identify pathology.
- Share your findings with the client and explain what impact any infection will have on the use (or continued use) of his/her preferred contraceptive method.
- If the client is found to have a sexually transmitted GTI, recommend that his/her sex partner be evaluated.
- Educate clients about the benefits of condom use.

The GTI screening and supplementary GTI histories are detailed below. Depending on the individual client, it may not be possible to ask some of the questions in a direct way. As the client-clinician relationship allows, determine this information in a respectful and culturally sensitive manner. Confidentiality must be assured for all clients being evaluated for a GTI.

GTI SCREENING HISTORY

A screening history should be brief; however, it must be sufficiently detailed to identify those clients for whom further investigation is indicated. It should include the following questions:

- Are you having a vaginal discharge?
- Have you had abnormal vaginal bleeding with the last two menstrual periods?
- Have you had pain or burning on urination?
- In the past year, have you had a genital tract problem such as a vaginal discharge, ulcers or skin lesions in your genital area?
- Do you think that you might have a genital tract infection?
- Has your sex partner been treated for a genital tract problem, such as discharge (drip) from the penis or swollen groin glands, in the last three months? Which?
- Does your sex partner have other sex partners that you know of?
- Have you had more than one sex partner in the last two months?

If the client answers "yes" to any of the above questions, he/she should undergo further evaluation for a possible GTI.

SUPPLEMENTARY GTI HISTORY

Items in the GTI history (in addition to those in the basic family planning history) which are important include:

- A description of relevant symptoms
 - Onset, duration, and progression
 - Relationship of symptoms to sexual intercourse and urination
 - Prior history of similar symptoms
 - Similar symptoms in a sex partner
- History of a prior GTI, including dates, diagnosis, and treatment if known
- Medication history
 - Recent antibiotic use
 - Drug allergies or sensitivities
 - Other current medication

- **Recent sexual history**
 - Time since last sexual exposure - was this a regular, casual or new partner?
 - Number of partners in past month
 - Pain or bleeding on intercourse
 - Use of condoms

GTI PHYSICAL EXAMINATION

A complete GTI examination does not need to be performed on all family planning clients. This examination should be reserved only for those clients who respond positively to one or more questions on the **screening** or the **supplementary GTI history**.

Female Examination

This examination need not be a time-consuming affair. The following tools are necessary in order to obtain the proper laboratory specimens:

- Vaginal speculum
- Dacron or cotton swabs (wire-handled for urethral smears)
- Large cotton swabs, such as those used for proctoscopy
- pH paper
- Glass slides with coverslips

When performing a GTI screening examination, there are two important steps which must be remembered. First, it is important to carefully inspect the perineum, vulva, vagina, and cervix in order to obtain qualitative information to support the diagnosis of infection. Second, one must utilize appropriate sampling techniques to maximize the chance of identifying any existing infection.

Begin by asking the client to undress. Assure privacy at all times. Cover with a sheet or drape, exposing only the part being examined.

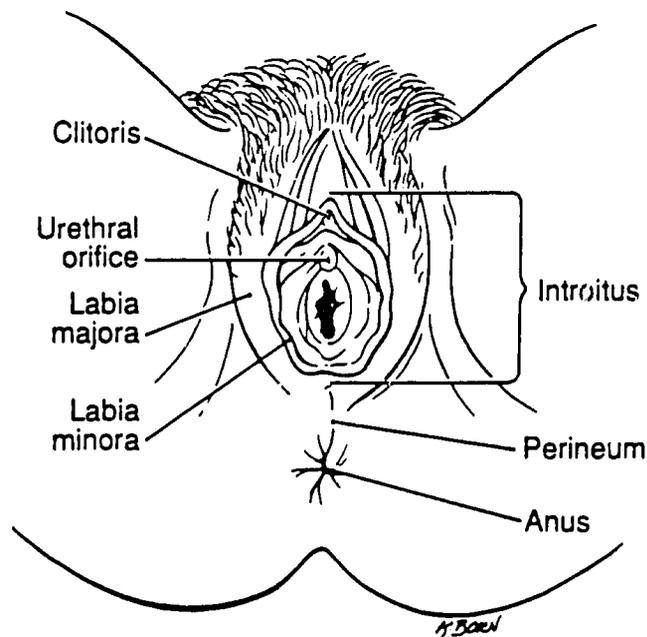
Pelvic Examination

Before proceeding to the pelvic examination, first perform an abdominal examination (inspection and palpation), and record the findings.

Vulvar Inspection and Palpation:

- Put clean gloves on both hands (if gloves are reusable, make sure they have been decontaminated, cleaned and high-level disinfected or sterilized after each use).
- Inspect thighs for rashes and lesions.

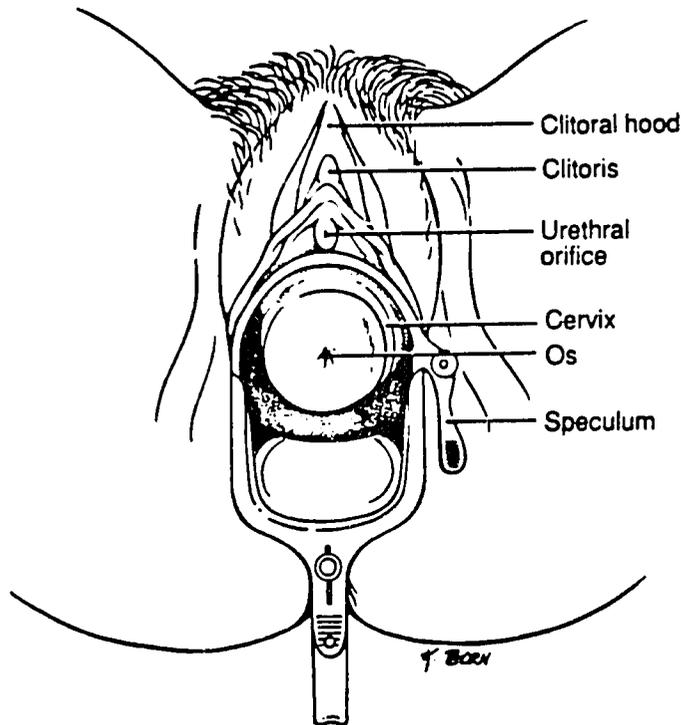
- Palpate groins for enlarged and/or tender nodes.
- Inspect pubic area for pubic lice, sores, and nodes.
- Inspect vulva, perineum and perianal skin for rashes, sores, warts, and swellings.
- Inspect labia and urethral opening for lesions or discharge (Skene's glands) and palpate the Bartholin's glands.
- Note the color, smell and characteristics of any discharge and take vaginal, cervical and/or urethral specimens for testing (Chapters 4 and 5).



Speculum Examination

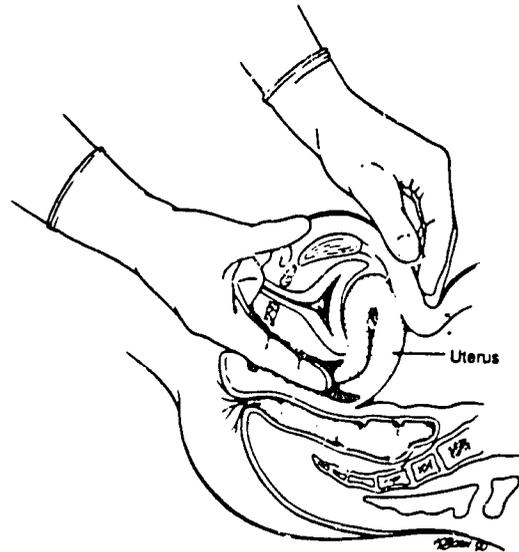
A good light source is essential.

- Gently insert the bivalve speculum into the vagina, inspecting the vagina for erythema, discharge, growths or lesions. Use a cotton swab to obtain a sample of the vaginal discharge for pH and for the normal saline and KOH wet mounts.
- Look at the cervix and evaluate for exocervical and endocervical abnormalities.
- The exocervix should be cleaned of all vaginal secretions, using a large cotton swab such as those used for proctoscopy. At this time, an endocervical sample should be obtained for Gram stain (Chapter 4).



Bimanual Examination

Carefully and gently palpate the vaginal walls, cervix, uterus, and adnexa to identify presence of upper genital tract tenderness, which could be suggestive of pelvic inflammatory disease.



Reminder: Perform a rectovaginal examination if:

- the findings on bimanual examination are confusing (e.g., position or size of the uterus is not confirmed),
- the uterus is retroverted (posterior-directed), or
- cul de sac tenderness or a mass is noted on bimanual examination.

Male Examination

Ask the client to undress from the chest down to the knees. (It is not necessary to have him lie down for the examination.)

Remember: Always wear gloves on both hands.

The only equipment needed are:

- small, wire-handled swabs for obtaining urethral smears, and
- glass slides with cover slips.

Inspection

Examine the client in good light. Look at the:

- **External genitalia**

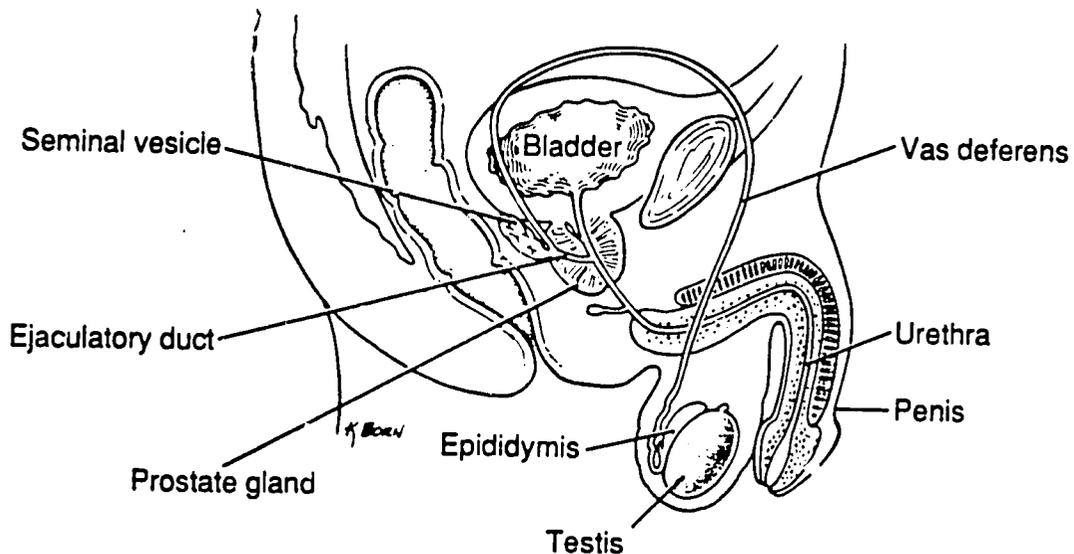
Carefully examine to detect the presence of genital lesions (ulcers or blisters) or enlarged lymph glands in the groin or genital area. If lesions are seen, one should note their location and character, and test as indicated (Chapter 7).

- **Pubic hair**

Inspect for pubic lice and nits. If any suspicious lesions are noted, test as indicated (Chapter 10).

- **Skin**

Check skin over the thighs, buttocks, and around anus. Note lesions, vesicles, rashes.



Palpation (Touching)

Examine:

- Penis

Retract the foreskin and look for urethral discharge and sores. If there is no obvious discharge, milk the urethra forward to see if any discharge can be extracted for a urethral smear (Chapters 5 and 6).

Palpate:

- Groins

Check for lymph node enlargement (buboes) and tenderness

- Scrotum

Feel the testes, epididymis and spermatic cord on each side to detect tenderness or swelling

- Ulcers

Determine if they are painful or painless, deep seated or superficial, and take appropriate smears for testing (Chapter 7).

FOUR

VAGINAL DISCHARGE

VULVOVAGINITIS

DEFINITION

GTI-related vaginal discharge is defined as a change in the color, odor, and/or an increase in the amount of vaginal secretion attributable to vaginal or cervical infection. It may be accompanied by pruritis, genital swelling, dysuria, or lower abdominal or back pain (WHO, 1984).

BACKGROUND

Vaginal discharge resulting from GTIs may cause vulvovaginitis or cervicitis in women. Managing vaginal discharge involves:

- obtaining a complete history,
- carefully performing and recording the indicated physical assessments,
- obtaining the necessary vaginal, cervical and/or urethral specimens, and
- doing the indicated microscopic and other tests.

If untreated or inadequately treated, GTIs such as gonorrhea and chlamydia can cause acute pelvic inflammatory disease (PID) in women or an epididymitis in their partners. Both diseases are major causes of infertility in developing countries (Westrom, 1984 and WHO, 1984).

Before effective treatment can be initiated, an accurate diagnosis must be made. In this chapter, two flowcharts have been developed to guide the clinician in arriving at the correct diagnosis.

Flowchart One: Vulvovaginitis

Flowchart Two: Cervicitis

Normal Vaginal Discharge

Vaginal discharge probably is the most common gynecologic problem seen in women. However, not all vaginal discharges are abnormal or symptomatic of infection. Typically, normal vaginal discharge goes unnoticed or may occasionally cause "staining" of the undergarments. It normally is clear or whitish, not foul-smelling and has a pH of less than 4.5.

The **amount** and **type** of vaginal discharge women produce vary according to a number of factors, such as:

- Phase of the Menstrual Cycle:** During the pre-ovulatory phase, the endocervical glands produce increasing amounts of thin, clear mucus which causes an increase in vaginal discharge. This usually peaks about the time of ovulation (mid-cycle), then decreases abruptly until the onset of the next menses. Moreover, during the pre-ovulatory phase, the mucus, which mixes with the vaginal contents to become the vaginal discharge, typically is described as "wet" or "slippery," while during the post-ovulatory phase, the discharge becomes "dry" or "tacky."
- Age:** Young sexually active women (age 18-40) have more vaginal discharge than older (over 50) women or those who are not sexually active.
- Parity:** Women have more discharge following childbirth; this may persist for several years after delivery.
- Contraceptive Method:** Barrier methods combined with use of a spermicidal foam or cream lead to increased discharge; but women using oral contraceptives (OCs), either combination or progesterone-only, usually have less discharge than "normal." Furthermore, the amount does not vary much from day to day, as it does in women not using OCs.
- Douching:** Although douching temporarily decreases vaginal discharge, it usually increases within days (or hours) due, in part, to chemical irritation caused by the douching and regrowth of normal and pathogenic microflora.

The characteristics of normal vaginal discharge are listed in Table 4.1. Also detailed are the usual characteristics of abnormal vaginal discharge caused by the three main causes of vulvovaginitis:

- Trichomoniasis
- Candidiasis (Candidiasis albicans or other species)
- Bacterial vaginosis (formerly called nonspecific vaginitis)

The key clinical and microscopic findings associated with each of these conditions are discussed below, **Symptoms and Signs**, and in **Appendix B: Basic Facts About GTIs**.

TABLE 4.1
CHARACTERISTICS OF
NORMAL AND ABNORMAL VAGINAL DISCHARGE

	NORMAL	CANDIDIASIS (YEAST)	TRICHO- MONIASIS	BACTERIAL VAGINOSIS ¹
Etiology	Uninfected (Gram-positive lactobacilli rods predominant)	Candidiasis albicans and other yeasts	<u>Trichomonas</u> <u>vaginalis</u>	Associated with <u>Gardnerella</u> <u>vaginalis</u> (Gram- negative rods predominant)
Symptoms	None	Severe vulvar itching, dysuria,	Genital irritation, pain on urination or with intercourse	Mild itching
Cervix	Pink	Pink	Usually pink, inflamed	Pink
Vagina	Pink	Reddish	Pink	Reddish
Discharge				
Amount	Varies with menstrual cycle, usually scant	Scant to moderate	Copious	Moderate
Color	Clear or white	White	Green, yellow or white	Gray or white
Consistency	Granular	Curdy, thick and "cheesy"; adherent	Sometimes frothy	Smooth, watery; adheres to vaginal side walls
Vaginal pH	Usually ≤ 4.5	≤ 4.5	Usually 5-7	Usually 5-7
Odor	Not foul	Yeasty	Foul	Strong, "fishy"

¹ Bacterial vaginosis (formerly nonspecific vaginitis) is so named because no single bacterial agent has been identified as the cause.

Remember: The vagina, like the mouth, contains many microorganisms. Normally the vagina harbors as many as 20-30 non-pathogenic bacteria and yeast. These microorganisms are important in maintaining a healthy vaginal environment. Under some circumstances, this delicate balance can be disturbed, and one or more of the microflora, such as yeast or gardnerella, becomes predominant. When this happens, a yeast vaginitis or bacterial vaginosis may result. Typical examples predominant.

- during pregnancy or with oral contraceptive use, and
- following antibiotic treatment. (The antibiotic kills off the normal bacteria, allowing the yeast to overgrow.)

An abnormal vaginal discharge also can be caused by a chemical irritation or rarely be due to an allergic reaction.

Remember:

- Candidiasis (yeast) vulvovaginitis and bacterial vaginosis are **not necessarily** transmitted sexually.
- Organisms causing infection of the endocervix and upper reproductive tract may also cause vaginal discharge. They include:
 - gonorrhea and
 - chlamydia.

Also, a vaginal discharge may occur with herpes simplex virus infections.

SYMPTOMS (HISTORY)

Common symptoms of **abnormal** vaginal discharge include:

- Soiling of underclothes
- Increase in amount of discharge
- Change in color and/or odor of discharge
- Perineal/vulvar itching
- Painful sexual intercourse
- Redness of the vulva

To determine causes of the discharge, ask about:

- Recent use of new chemicals or irritants such as spermicides, douches, or unusually frequent sexual intercourse
- Symptoms of PID, including fever and lower abdominal pain
- Symptoms of pregnancy

Inquire about other significant events or conditions:

- Sexual contact with a man with discharge from his penis (urethritis) or other GTIs
- Factors predisposing to candidiasis vaginitis, such as pregnancy, diabetes mellitus or use of:
 - oral contraceptives
 - antibiotics (most commonly tetracycline and ampicillin)
 - corticosteroids
- Diaphragm, condom or spermicide use

SIGNS (PHYSICAL EXAMINATION)

In women with vaginal discharge, special attention should be paid to performing the pelvic examination as follows:

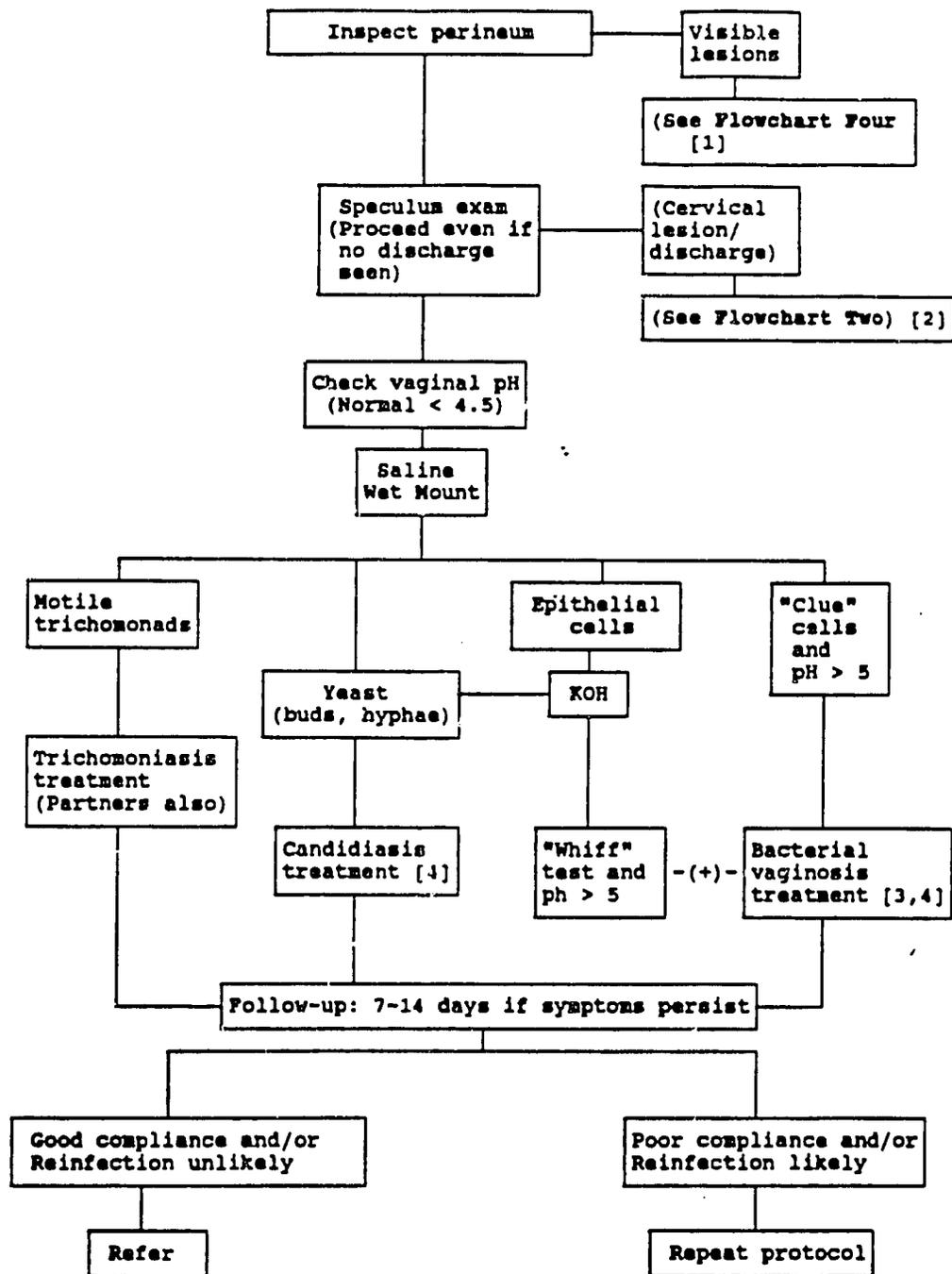
- During the speculum exam, determine where the discharge is coming from (vagina, cervix or urethra).
- Note the consistency (watery or tacky), amount (scant, moderate or copious) and color (clear, cloudy or yellow) of the discharge.
- Note associated characteristics of the cervix and/or vaginal tissue, such as friability -- bleeds redness or irritation.
- Collect specimens as indicated for immediate testing (e.g., vaginal specimen for pH, wet mount and/or KOH and cervical/urethral smear for Gram stain).

DIAGNOSTIC TIPS

- A complete evaluation should be done on all clients with complaints of vaginal discharge and on all clients responding "yes" to any questions in the screening or supplemental GTI history. **(The discharge may not be visible but pathology may be there.)**
- The evaluation can be done even if the client is menstruating; however, if she wishes to defer the examination, she should return as soon as possible after completing her menses.
- The vaginal pH generally is elevated (> 4.5) with trichomoniasis and bacterial vaginosis. Other causes for elevation of the vaginal pH are: pregnancy and presence of sperm, blood or menstrual fluid in the vaginal secretions.
- Trichomonads are best visualized in the saline wet mount. This test is not fool-proof, however, for they may be missed about 25% of the time even when the saline and KOH wet mounts are correctly prepared and carefully examined (Stamm et al, 1988).

FLOWCHART ONE

VAGINAL DISCHARGE: VULVOVAGINITIS



- [1] Even if perineal lesions are present, evaluate vaginal discharge as well. Before the client leaves the clinic, ensure that she has received treatment for all conditions presumed or found.
- [2] Do Gram stain of cervical smear to rule out gonorrhea also (see Flowchart Two) before starting treatment.
- [3] If either >20% clue cells and/or positive "Whiff" test, consider as probable bacterial vaginosis; treat if symptomatic.
- [4] Bacterial vaginosis and candidiasis tend to relapse, but are not considered to be sexually transmitted or require partner notification.

- **Candida (yeast)** are very hard to see on saline wet mount because of the vaginal epithelial cells and other debris, such as red cells (RBCs). Even in the KOH wet mount, where it is easiest to see, it is identified only about 50-60% of the time. Because of this, a woman with signs and symptoms of candidiasis should be treated even if the saline and KOH wet mounts are negative (Stamm et al, 1988).
- **Criteria for bacterial vaginosis:** Three of the following four criteria should be met to diagnose bacterial vaginosis:
 - pH greater than 4.5 (a pH <4.5 rules out bacterial vaginosis as a cause for the discharge),
 - whitish, smooth discharge which adheres to vaginal side walls,
 - greater than 20% clue cells, and
 - a positive "Whiff" test -- amine-like (fishy) smell when KOH is added to the specimen.

In equivocal cases, a Gram stain of vaginal discharge showing predominance of Gram-negative organisms rather than Gram-positive lactobacilli (normal microflora) supports the diagnosis of bacterial vaginosis (Stamm et al, 1988). **Remember: Only symptomatic clients with bacterial vaginosis should be treated.**

- Women with a history of symptomatic vaginal discharge, but without a visible discharge on exam or microscopic evidence of vaginitis should be re-examined within seven days, if the symptoms persist. **They should be advised not to douche, if they usually do so, for at least two days prior to the next exam.**

Key diagnostic characteristics of the most important GTIs causing vulvovaginitis are summarized below.

TABLE 4.2

DIAGNOSTIC CHARACTERISTICS OF GTIs CAUSING VAGINAL DISCHARGE

Etiology	Candidiasis	Trichomoniasis	Bacterial Vaginosis	CG/Chlamydia
Signs and/or Symptoms	1. Itchy vulvar discharge	1. Green/yellow discharge	1. White/grey discharge	1. Mucopurulent discharge from cervix
	2. Curd-like (cheesy) discharge	2. Foul-smelling, frothy discharge	2. "Fishy" smelling discharge	2. Friable (bleeds easily) cervix
Confirmation	3. Hyphae or budding yeast visible on wet mount or KOH	3. Motile trichomonads on wet mount	3. > 20% clue cells and positive "Whiff" test (fishy smell with KOH)	3. Gram stain: Gram-negative intracellular diplococci (GNIDs)
			4. pH > 4.5	

TREATMENT

(See APPENDIX C: GTI Treatment Guidelines.)

WHEN TO REFER

- Recurrent trichomoniasis usually represents reinfection of both partners. Refer if simultaneous treatment of both client and partner(s) fails, compliance is good, and reinfection unlikely.

Remember: With recurrent candidiasis or bacterial vaginosis:

- Both are not necessarily sexually transmitted but often are due to a disturbance in the balance of the vaginal microflora
- Search for possible underlying causes such as pregnancy, diabetes, recent antibiotics, or use of corticosteroids or oral/injectable steroid contraceptives
- If no cause is found and symptoms persist or worsen the client should be referred.
- Clients with non-diagnostic studies on two separate examinations should be referred if symptoms persist.

FAMILY PLANNING CONSIDERATIONS

- While vulvovaginitis generally is not associated with long-term problems which adversely affect a woman's reproductive health, recurrent or prolonged bouts of vulvovaginitis can be disabling.
- Women who have recurrent vaginal infections may need to consider switching contraceptives. For those who use oral contraceptive pills (OCs), one may try switching to another pill preparation rather than discontinuing pills altogether if recurrent yeast vaginitis is a problem.
- Women with trichomonal vaginitis are at increased risk of acquiring other types of GTIs. As such, they should be counseled that IUDs may be more risky (i.e., IUDs should not be their first choice as a contraceptive method).
- IUDs can be safely inserted in women following treatment of simple vulvovaginitis (yeast or bacterial vaginosis) and in women with increased normal vaginal discharge (i.e., no pathogens identified).
- If an IUD user is having problems with recurrent, symptomatic bacterial vaginosis, she should be encouraged to use vaginal spermicides in order to possibly decrease the frequency of recurrences.

HEALTH EDUCATION

Discuss with the client:

- The risks of multiple sexual partners
- The need to use condoms and spermicides to avoid GTIs
- The need to treat both partners for trichomoniasis, gonorrhea and chlamydia
- The importance of completing a course of treatment

CERVICITIS

DEFINITION

GTI-related vaginal discharge is defined as a change in the color, odor, and/or an increase in the amount of vaginal secretion attributable to vaginal or cervical infection. It may be accompanied by pruritis, genital swelling, dysuria, or lower abdominal or back pain (WHC, 1984).

BACKGROUND

Women with cervicitis may present with a history of abnormal vaginal discharge, but often are without symptoms. In fact, most women with cervical infections are identified either because:

- their partners were treated for a GTI, such as gonorrhea, or
- they are found to have cervicitis as part of a normal pelvic (speculum) examination, upon being fitted for a diaphragm or considering an IUD.

There are two types of cervicitis:

- infectious (or mucopurulent), and
- ectopic.

It is important to differentiate the two.

Infectious cervicitis is an inflammatory process of the cervical epithelium, (i.e., the round cells lining the endocervical canal and spreading out on to the face of the cervix). If untreated, this infection can spread upwards to infect the uterus and fallopian tubes causing pelvic inflammatory disease (PID). PID is a major cause of infertility in women (Wasserheit, 1989).

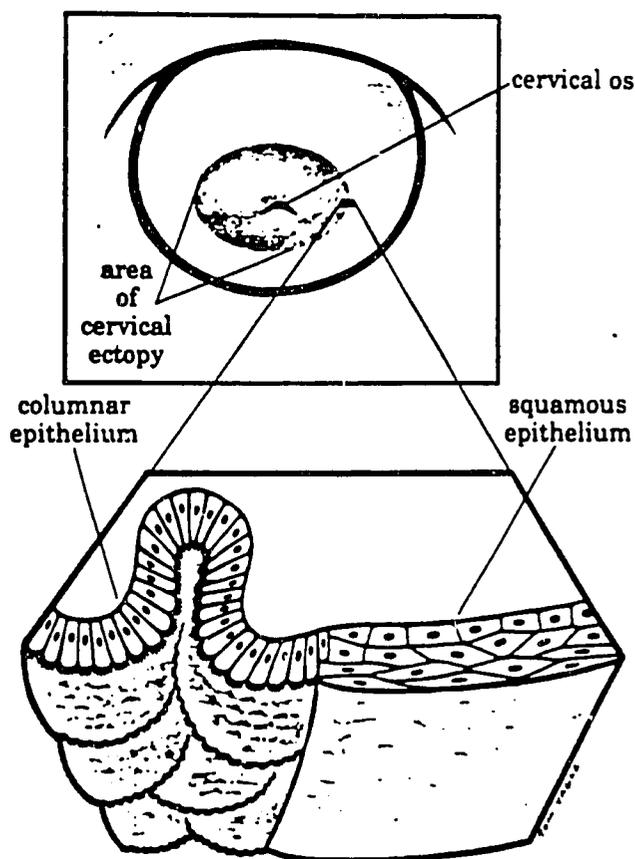
The two main causes of infectious cervicitis are:

- gonorrhea (*Neisseria gonorrhoea*), and
- chlamydia (*Chlamydia trachomatis*).

Other microorganisms, such as herpes (HSV) and human papilloma virus (HPV) are much less common as causes of cervicitis.

Ectopic cervicitis represents the persistence or extension of normal endocervical cells, which are raised and red, on the exocervix (face of the cervix). Normally, the face of the cervix is covered with flat, pinkish cells called squamous epithelium (see figure below). Ectopy is commonly seen in young girls (16 or less) and in women on oral contraceptives (OCs) and may or may not be associated with a cervical infection. In older women (35-50), "ectopy" may be due to mechanical/chemical trauma or viral infection with human papilloma virus (HPV).

The clinical appearance of both types of cervicitis is very similar - a "beefy" red cervix which bleeds easily (friable). Therefore, in a woman over 35, if the cervix does not heal after specific treatment, but symptoms (e.g., burning, vaginal discharge or bleeding) disappear after the infectious component of the cervicitis is successfully treated, she should be evaluated for possible pre-cancerous changes (dysplasia) of the cervix (Judson, 1989). (See Chapter 10 for additional information on HPV and cervical dysplasia.)



In evaluating a woman for cervicitis, consult **Flowchart Two (Cervicitis)** for how to proceed. Check **Flowchart Three (Urethritis)** or **Flowchart One (Vulvovaginitis)** if the discharge is coming from the urethra or vagina, respectively. Finally, for additional clinical information on the microorganisms causing cervicitis, see **Appendix B: Basic Facts About GTIs**.

SYMPTOMS (HISTORY)

Women with cervicitis may have burning on urination and even vaginal bleeding or spotting, especially after sexual intercourse. As mentioned above, however, most will have no symptoms.

In women with symptomatic vaginal discharge, first determine where the discharge is coming from - vagina, cervix or urethra. When performing the pelvic examination, it is important to gently push on the glands (Skene's) on either side of the opening of the female urethra to see if they are tender or if a discharge is present. (See **Chapter 5: Urethritis**, for management)

SIGNS (PHYSICAL EXAMINATION)

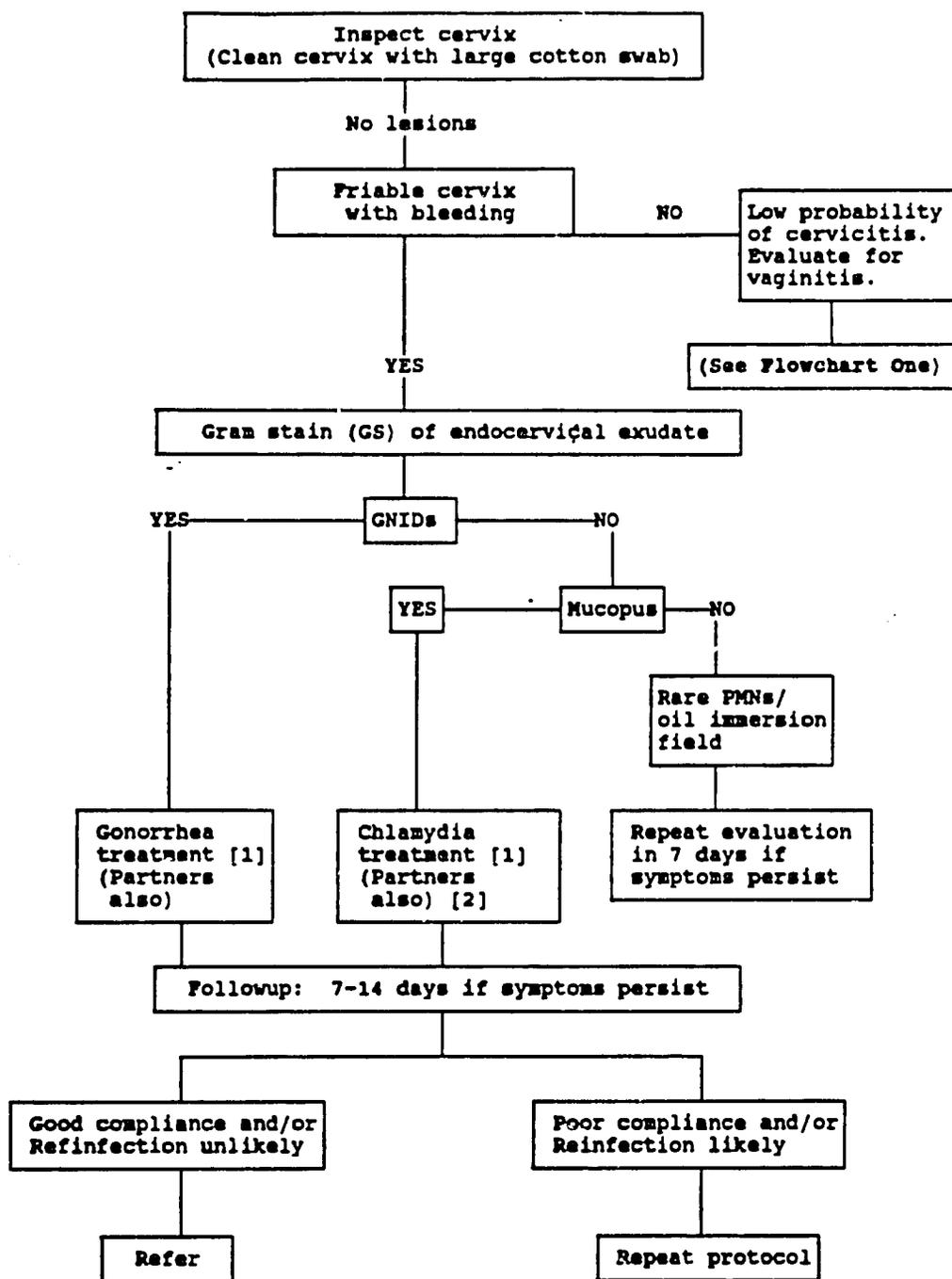
In a woman with cervicitis, the cervix may bleed if touched with a cotton swab (friable) and/or may have yellow (purulent) mucus pouring out of the cervical os. By contrast, the normal cervix is flat, pink in color and does not bleed when touched. Also, in women who do not have cervicitis, the cervical mucus is either clear (pre-ovulatory) or whitish (post-ovulatory). Furthermore, the amount of pre-ovulatory mucus may be considerable, especially just before ovulation (mid-cycle); whereas post-ovulatory mucus is always scant, whitish in color and very sticky (tacky).

DIAGNOSTIC TIPS

- An evaluation for cervicitis is needed **not only** when a client is found to have a cervical discharge, **but also** when:
 - a client's sex partner has urethritis or a genital ulcer or swollen lymph gland in the groin (bubo), or
 - the client has a vaginal discharge which is positive for trichomoniasis.
- Under ideal circumstances, the **specificity** of cervical Gram stain in women is 97%. However, it is more difficult to identify Gram-negative intracellular diplococci (GNIDs) on cervical smears than on urethral smears because of contamination with other microflora. As a consequence, the **sensitivity** is much lower. In only about 40-60% of women with culture-positive gonorrhea are GNIDs seen on a cervical smear, compared to 98% or greater on a urethral smear (Stamm et al, 1988).
- Of those women found to have gonorrhea on cervical smear, approximately 30-40% also will be culture positive for chlamydia and should be treated for both gonorrhea and chlamydia (WHO, 1984 and Stamm, 1988).

FLOWCHART TWO

VAGINAL DISCHARGE: CERVICITIS



GNIDs: Gram-negative intracellular diplococci
 PMNs: Polymorphonuclear white blood cells

- [1] If epidemiologic data indicate mixed infections (gonorrhoea and chlamydia) are quite common, treat for both.
- [2] Advisability of male partner notification in absence of confirmed diagnosis depends on local cultural and prevalence factors.

- Infectious (mucopurulent) cervicitis due to chlamydia should be suspected if any of the following is present:
 - heavy mucoid cervical discharge,
 - purulent (yellow) endocervical discharge on physical exam, and
 - friability, defined as spontaneous bleeding from the exocervix, or following the insertion of a cotton swab.

This diagnosis is confirmed by culturing the chlamydia or by using one of the newer fluorescent antibody (FA) or monoclonal antibody (ELISA) tests. Because of their expense and/or the lack of laboratory facilities, these tests may be unavailable. Fortunately, using the above criteria and microscopic findings will identify most women with chlamydia cervicitis.

- Women with a purulent (mucopus) cervicitis should be treated for chlamydia even if the Gram-stained smear is negative for GNIDs.
- The prevalence of chlamydial cervicitis is greater in women with ectopy (i.e., persistence or extension of endocervical cells on the face of the cervix) than in those without it. This happens because chlamydia more easily infect the columnar (round) epithelial cells exposed through ectopy than the squamous (flat) cells normally covering the exocervix (Outlook, 1991).

TREATMENT

(See APPENDIX C: GTI Treatment Guidelines)

WHEN TO REFER

- Clients with persistent infection require careful counseling and reevaluation. If simultaneous treatment of both partners fails, compliance is good and reinfection unlikely, both should be referred.
- Clients over 35 years of age with negative gross microscopic evidence of infection and clinical evidence of cervicitis or ectopy should be referred to rule out cervical intraepithelial neoplasia.

FAMILY PLANNING CONSIDERATIONS

- Women who have infectious cervicitis (gonorrhea or chlamydia) should consider using contraceptive methods which are not associated with increased risk of cervicitis (OCs) or PID (IUDs). OC users appear to be more susceptible to chlamydial infection, possibly because of the higher frequency of cervical ectopy (Holmes, 1990). If this is not possible,

it is important to encourage the client to supplement her contraceptive routine with the use of either condoms and/or spermicide-containing products.

- IUDs should not be inserted in women at risk for or with a documented recent (3-6 months) history of gonorrhea, mucopurulent (chlamydial) cervicitis, septic abortion, postpartum uterine (endometritis) infection, or PID.
- Women being treated for gonorrheal cervicitis or nongonorrheal cervicitis (NGC), who also have an IUD, should have it removed.

HEALTH EDUCATION

Discuss with the client:

- The dangers of multiple sexual partners
- The need to use condoms and spermicides to avoid GTIs
- The need to contact and treat all partners
- The importance of completing the full course of treatment when a sexually transmitted GTI has been diagnosed
- The need to return if the symptoms persist or worsen (e.g., develops lower abdominal pain or fever)
- The need to refrain from sexual activity until the treatment has been completed and symptoms (if present) are gone

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FIVE

URETHRAL DISCHARGE

DEFINITION

A GTI-related urethritis is characterized by the presence of a secretion in the anterior urethra, sometimes accompanied by dysuria or urethral discomfort (WHO, 1984).

BACKGROUND

Men with urethral discharge have abnormal secretions coming from the tip of the penis. Women with urethral discharge have abnormal secretions coming from the urethra. Urethral discharge is the most common complaint in men with GTIs. Untreated urethritis can lead to complications such as epididymitis (in men), pelvic infection (in women), and urethral stricture and infertility (in both sexes).

The two main causes of urethral discharge are:

- gonococcal urethritis caused by Neisseria gonorrhoea, and
- non-gonococcal urethritis (NGU)

Chlamydia trachomatis is the most common cause of NGU, up to 50% of cases. Occasionally, urethritis results from infection with T. vaginalis, and rarely from Ureaplasma urealyticum or herpes (HSV). Most clients with herpetic urethritis also will have obvious lesions on the penis or genitals, while men with trichomonal urethritis usually will have sex partners with vaginitis. In some populations a third or more of men and women with gonorrhea also are infected with chlamydia.

Before effective treatment can be initiated, an accurate diagnosis must be made. In this chapter, a flowchart has been developed to guide the clinician in arriving at the correct diagnosis.

Flowchart Three: Urethral Discharge: Urethritis

SYMPTOMS (HISTORY)

Gonococcal urethritis often causes more severe symptoms and has a shorter incubation period (2-3 days) than NGU (7-14 days) (WHO, 1984). Consequently, some clinicians in high gonococcal prevalence areas rely on the characteristics of the urethral discharge to differentiate between gonorrhea (abundant, purulent secretion) and NGU (scanty secretion, usually mucoid or serous). However, these physical signs are not sufficiently discriminatory to predict the etiology of the urethral discharge in a given client. The clinician must be aware of the possibility of concomitant (gonococcal and chlamydial) infection in the client.

The most common complaints of urethritis are:

- pus dripping from the penis,
- vaginal discharge, and
- burning or pain on urination (both sexes).

In women, it is sometimes difficult to separate symptoms of urethritis from those of vaginitis or cystitis (urinary tract infections). Some of the important clinical and laboratory differences between these problems are listed in Table 5.1.

SIGNS (PHYSICAL EXAMINATION)

Remember: Wear gloves on both hands when examining males or females.

In men

In uncircumcised males it is important to check that the secretion is coming from the urethral meatus and not from the glans or foreskin (see **Chapter 7**). The discharge may range from "abundant and purulent" to "scarce and mucoid." It may be necessary to "milk" the urethra in order to see the discharge.

In women

If the woman complains of burning when urinating and/or vaginal discharge, the clinician should examine her to determine whether the discharge is coming from the vagina, the cervix, or the urethra.

DIAGNOSTIC TIPS

- A specimen of the discharge should be stained with Gram stain and viewed under the microscope. Gram-negative intracellular diplococci (GNIDs) indicate the presence of gonorrhea. Five or more WBCs per oil immersion (100X) field without GNIDs will be seen if the client has non-gonococcal urethritis (NGU). The sensitivity and specificity of the urethral Gram stain is very high for gonorrhea; 98% in culture-proven cases (see **Appendix A: Gram Stain**) (WHO, 1984).

TABLE 5.1

IMPORTANT SYMPTOMS AND SIGNS OF LOWER GENITOURINARY TRACT INFECTIONS IN WOMEN

	CYSTITIS	URETHRITIS	VAGINITIS
HISTORY	Internal burning, urgency and/or frequency on urination History of cystitis or hematuria Acute onset and short duration of symptoms	Internal burning on urination Gradual onset of symptoms Long duration of symptoms	External burning on urination Vulvar itching Painful intercourse Abnormal vaginal discharge
EXAM	Suprapubic or bladder tenderness	Vaginal exam normal and/or findings of cervicitis often present	Typical findings of candidiasis, trichomoniasis or bacterial vaginosis
URINALYSIS	Pyuria (mid-stream urine); hematuria in half of cases	Pyuria (initial void only); no hematuria	No pyuria or hematuria
URINE MICROSCOPY (MB or GS of unspun urine)	[> 1 Gram-negative rods/oil immersion (100X) field]	Negative	Negative
MICROSCOPIC EXAM (Wet prep or KOH of vaginal discharge)	Negative	Negative	[Positive for candidiasis, trichomoniasis or bacterial vaginosis]
MICROSCOPIC EXAM (MB or GS of urethra (or cervical smear))	Negative	[Positive for GC or NGU (chlamydia)]	[Negative]

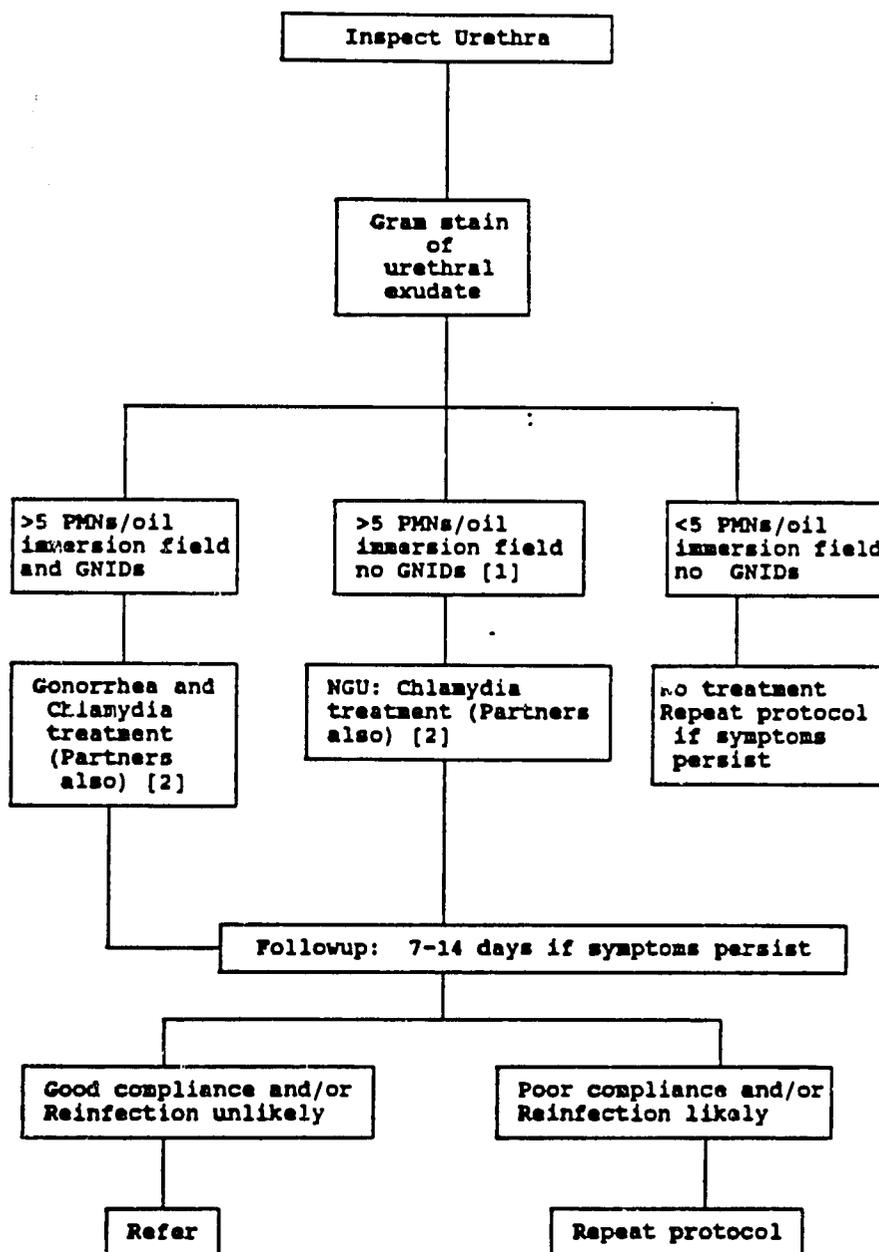
MB: Methylene blue; GS: Gram stain

GC: *Neisseria gonorrhoea*; NGU: non-gonococcal urethritis

[bold]: Indicates key diagnostic result

FLOWCHART THREE

URETHRAL DISCHARGE: URETHRITIS



GNIDs: Gram-negative intracellular diplococci

PMNs: Polymorphonuclear white blood cells

NGU: Non-Gonococcal urethritis

[1] Complaints of urethral discharge or dysuria, without presence of urethral discharge, should be investigated similarly.

[2] Notification and treatment of female partner(s) is one of the best ways of identifying women at high risk of having asymptomatic gonococcal and/or chlamydial infections.

- In most settings, cultures for isolation of N. gonorrhoea are not routinely available. (Because the results would not be known for two or more days, obtaining a culture is not helpful in guiding the initial management decision). Cultures are only important when isolation of the gonococcus is required (e.g., screening for beta-lactamase production, or testing for antimicrobial susceptibility at a reference laboratory). (WHO, 1989)

Cultures for C. trachomatis, U. urealyticum, and other microorganisms are rarely available except in specialized settings. Even when available, they will not aid in the initial decision to treat the client. (WHO, 1989)

Newer non-culture tests for C. trachomatis (e.g., the fluorescent antibody and ELISA tests) and for N. gonorrhoea (e.g., ELISA test) are being evaluated. These technologies are still expensive and insufficiently tested for widespread application.

- All individuals with a history of urethral discharge should have a urethral specimen Gram-stained and read. They may not have a urethral discharge at the time of examination due to their having recently urinated. Clients with symptoms of urethritis, but without a visible discharge on exam or microscopic evidence of urethritis (less than 5 PMNs per oil immersion field), should be re-examined within seven days and should not have urinated for at least two hours, preferably four to six hours prior to this examination.
- In women suspected of having cystitis, evaluation should include microscopic urinalysis. Clients should be carefully instructed on the "clean catch" technique for collecting midstream urine specimen (see Appendix A: Urine Microscopy). A methylene blue stain of an uncentrifuged ("unspun") urine sample showing 1 or more rods per oil immersion field correlates well with a colony count of greater than 10^5 organisms/ml and is consistent with cystitis.
- Women without evidence of vaginitis or cervicitis on examination but with pyuria and bacteriuria (pus cells and bacteria in the urine) usually have a bladder infection. Remember: the presence of epithelial cells or more than one type of microorganism suggests poor clean-catch technique (vaginal contamination). This finding reduces the diagnostic value of examining an "unspun" urine specimen (see Appendix A: Urine Microscopy).

TREATMENT

(See Appendix C: GTI Treatment Guidelines)

The choice of an appropriate regimen is crucial. Only in countries where gonococci are still sensitive to tetracyclines and erythromycin are the NGU treatment schedules for chlamydial infections with these antibiotics effective in also curing gonorrhea.

Owing to varying resistance patterns, the choice of an appropriate treatment for gonorrhea may be difficult. National or local health authorities need to consider the following before recommending any therapeutic regimen:

- Prevalence of beta-lactamase producing gonococci in the area and the level of chromosomal sensitivity to penicillin and other antimicrobials.
- Results of local clinical trials with recommended antibiotic treatment schedules.

WHEN TO REFER

- Men who are symptomatic with less than 5 PMNs per oil immersion field and no GNIDs on at least two examinations should be referred.
- Men or women who are treated simultaneously with their partners twice for gonorrhea and chlamydia and still are found to be symptomatic should be referred.

FAMILY PLANNING CONSIDERATIONS

- Women at risk for or with a documented recent (3-6 months) gonorrheal urethritis or NGU should be advised not to use an IUD.
- If an IUD is present at time of diagnosis of GTI-related urethritis, removal of the IUD should be considered and the client counseled to use an alternative contraceptive method.

HEALTH EDUCATION

Discuss with the client:

- The risks of multiple sexual partners
- The need to use condoms or spermicides to avoid GTIs
- The need to contact and treat all partners
- The importance of completing the full course of treatment when a sexually transmitted GTI has been diagnosed
- The need to return within 48 hours if the symptoms persist or worsen (e.g., development of lower abdominal pain or fever in women or scrotal pain or swelling in men)
- The need to refrain from sexual activity until the treatment is completed and the symptoms (if present) are gone

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INFLAMMATION OF THE PENIS (GLANS) OR FORESKIN

DEFINITION

Inflammation of the glans (**balanitis**) and/or the foreskin (**posthitis**) of the penis may occur simultaneously. A mild to profuse superficial secretion may be present and should be distinguished from urethral discharge by direct inspection. Balanitis may be accompanied by **phimosis** (i.e., difficulty in retracting the prepuce [foreskin]).

BACKGROUND

Males with balanitis or balanoposthitis usually do **not** seek medical attention for these conditions; however, these problems can produce considerable discomfort (irritation, itching etc.) In uncircumcised males, they are usually the result of poor hygiene. Their importance rests in differentiating them from more serious causes of urethral discharges (**Chapter 5**) or genital ulcers (**Chapter 7**).

SYMPTOMS (HISTORY)

The man usually complains of a "swollen penis", itching of the glans penis, discharge or difficulty retracting the foreskin (**phimosis**).

SIGNS (PHYSICAL EXAMINATION)

Common findings are: redness of the glans and the penis, sores and sometimes white secretions. In addition, the skin may show peeling and redness.

DIAGNOSTIC TIPS

- Lack of good hygiene is a predisposing factor especially in uncircumcised males. Microorganisms commonly causing balanitis are strains of staphylococcus, streptococcus, and Candida albicans. In most cases the client's partner shows no subjective nor objective signs of infection but some partners may have evidence of vulvovaginal candidiasis.
- The most common cause of **severe** balanitis is Candida albicans. Some pathological conditions predispose to candidiasis, for example, diabetes. Also, spread of infection from a female partner is common.

- A wet mount or KOH preparation will show fungal pseudohyphae or spores between epithelial cells in cases of candidiasis (**Appendix A: Saline and KOH Wet Mounts**).
- If penile (urethral) discharge or genital ulcers are present, refer to **Chapters 5 or 7**, respectively for diagnosis and management.

TREATMENT

(See **Appendix C: GTI Treatment Guidelines**)

- Clinical examination and microscopic testing usually are sufficient to guide treatment.
- Treat female partner if candidiasis is diagnosed.

WHEN TO REFER

Recurrent candidiasis:

- Assess for improvement in hygiene
- Search for possible underlying etiology, such as diabetes, recent antibiotics or use of corticosteroids
- Check partner to rule out reinfection

If no cause is found and symptoms persist or worsen, the client should be referred.

FAMILY PLANNING CONSIDERATIONS

- While balanitis generally is not associated with long-term problems which adversely affect a man's reproductive health, recurrent or prolonged bouts may be disabling.
- Women using oral contraceptives who have recurrent vaginal infections due to reinfection from partners with balanitis may need to consider switching contraceptives. (One may try switching to another pill preparation rather than discontinuing pills altogether if recurrent yeast vaginitis is a problem.)
- Following treatment of simple balanitis in males or vulvovaginitis due to candidiasis in females, IUDs can be safely inserted in women.

HEALTH EDUCATION

- Educate males about the importance of good personal hygiene.
- Clients with balanitis requiring treatment should be urged **not** to have sexual relations until completely cured.

GENITAL ULCERS AND BUBOES

DEFINITION

A man or woman with **genital ulcers** caused by a GTI has one or more open sores or lesions on the genitals. These ulcers may be either painful or painless and may be associated with enlarged and/or fluctuant lymph nodes called **buboes** in the groin.

BACKGROUND

In developing countries, the causes of these infections are:

- Chancroid (Haemophilus ducreyi)
- Syphilis (Treponema pallidum)
- Lymphogranuloma Venereum (Chlamydia trachomatis)
- Granuloma inguinale (Calymmatobacterium granulomatis)
- Genital herpes (Herpes Simplex Virus)

The common link in all these infections is that they are sexually transmitted. The pattern of disease (appearance of ulcer, location, presence of pain, etc.) varies not only from place to place, but in recent years, due to the emergence of AIDS (HIV), has become even more variable.

The relative frequency of the different microorganisms causing genital ulcers varies according to the setting. In studies in East and Southern Africa H. ducreyi infections (chancroid) accounted for 40-60% of all cases; T. pallidum (syphilis) for 9-17%; C. trachomatis (LGV) for 0-12%; and herpes simplex viruses for 4-11%, and donovanosis for 0-1%. In Thailand, chancroid outnumbers syphilis (30:1) as a cause of genital ulcer disease (WHO, 1984).

In areas where AIDS is present, the classic findings described below for these infections may be markedly altered. Therefore, accurate diagnosis of the particular GTI causing the clinical findings may be difficult even where serology, cultures and other microbiologic tests are available. The availability of darkfield microscopy and/or serologic testing greatly facilitates diagnosis (see **Appendix A: Additional Procedures**).

Before effective treatment can be initiated, an accurate diagnosis must be made. In this chapter, a flowchart has been developed to guide the clinician in arriving at the correct diagnosis.

Flowchart Four: Genital Ulcers and Buboes

. 11'

SYMPTOMS (HISTORY)

A detailed history is critical to making the correct diagnosis. Careful description of the evolution of the ulcer also is important. Try to determine the etiology (or possible etiology) based on the history.

The most common symptom is genital ulcer(s) that are either painful or painless. Females also may have burning on urination if the ulcer(s) is on the vulva.

In men

- The foreskin may not retract (phimosis)
- They may have a discharge from the penis

In both sexes

- Pain or swelling in one or both groins (buboes) is a common complaint

Remember: Inquire about whether the client is a sexual partner of a person with a genital ulcer or enlarged tender or draining lymph nodes (buboes).

SIGNS (PHYSICAL EXAMINATION)

Remember: Always wear gloves (**both hands**) when examining clients with genital ulcers and/or buboes. It is important to:

- Note location and characteristics of the ulcer(s) and/or buboes
- Examine for accompanying lymph node enlargement

The important clinical findings (symptoms and signs) differentiating the four commonest causes of genital ulcers are detailed below (Table 7.1) and in Appendix B: Basic Facts About GTIs.

The most common presentations of those pathogens causing genital ulcer disease are:

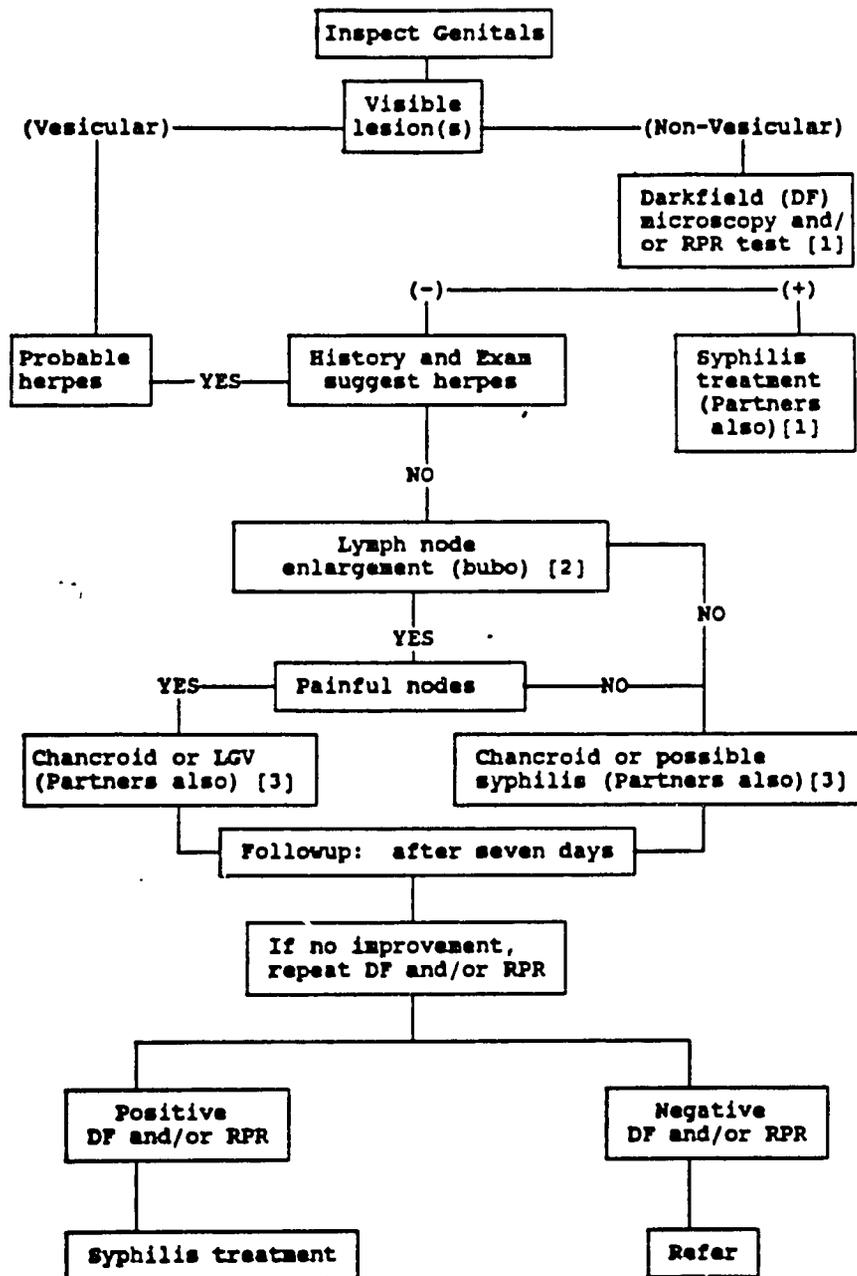
- **Lymphogranuloma venereum (LGV):** Usually solitary, **painful** small ulcer on the genitals which heals without treatment; later the client develops a bubo (or bilateral buboes) with many openings which may form abscesses and drain pus periodically.
- **Syphilis:** Usually a solitary, **painless** ulcer with a raised, indurated border. The edges of the ulcer are smooth and feel firm and rubbery on palpation.
- **Chancroid:** Usually a solitary, **painful**, dirty ulcer with irregular borders. Lymph nodes are painful, quite enlarged and may be fluctuant - a typical appearance of a bubo.

TABLE 7.1
 CLINICAL CHARACTERISTICS OF GTIs
 CAUSING GENITAL ULCERS

	LYMPHOGRAN- ULOMA VENEREUM (LGV)	SYPHILIS	CHANCROID	PRIMARY/ RECURRENT HERPES (HSV)
PRIMARY LESION	Papule, pustule, ulcer	Ulcer, papule	Ulcer, papule	Papule, pustule, ulcer
NUMBER OF LESIONS	[Usually one]	Usually one	Usually one, may be multiple	Multiple
SECRETION	Variable	Serous	[Purulent and hemorrhagic]	[Variable]
GENITAL DISTRIBUTION	Urethra, cervix, rectum	Vulva, vagina, penis, anus, perianal, oral	Clitoris, vulva, vagina, penis, anus	In women: labia, urethra, cervix In men: penis, urethra, rectum
PAIN	No	[Rare]	Yes	[Yes (dyspareunia, dysuria)]
ITCHING	[Yes]	No	No	No
LYMPH NODES	Tender, may suppurate, enlarged	[Nontender, firm, enlarged]	Tender, may suppurate, enlarged	Tender, firm, enlarged (bilateral)
INCUBATION PERIOD	3-21 days	10-90 days	1-14 days	3-21 days (primary) 6-9 months (recurrent)
TIME COURSE	1-2 weeks	2-3 weeks	2-3 weeks	3 weeks (primary) 7-10 days (recurrent)

[bold]: Indicates key diagnostic finding

FLOWCHART FOUR GENITAL ULCERS AND BUBOES



- [1] Followup after 7 days. If no improvement, refer.
 [2] If node(s) fluctant, appear pus-filled, aspirate to relieve symptoms with a large needle (18-gauge) every two days. To avoid fistulisation, aspirate through healthy adjacent skin.
 [3] Advisability of male partner notification in absence of confirmed diagnosis depends on local cultural and prevalence factors.

- **Genital herpes:** Intact blisters (vesicles) may be observed, but they quickly rupture and create multiple shallow, small ulcerations, which are **usually painful**. Lymph nodes, if involved, are bilaterally enlarged and painful.
- **Granuloma inguinale:** Genital ulcers usually do not develop. Instead, the client develops lumps or nodules under the skin. These nodules when found in the inguinale region are known as "pseudobuboes." With time the nodules become larger and eventually rupture through the skin and present as painless, beefy red, elevated ulcers. The regional lymph nodes typically are not enlarged as they are with the other four GTIs. Finally, the incubation period is highly variable.

In summary, painless, indurated lesions are attributed to syphilis; painful, easily bleeding sores are attributed to chancroid; the presence of vesicular lesions or superficial erosions indicates probable herpetic infection.

Because genital ulcers often do not correspond to textbook descriptions, especially in areas where chancroid and syphilis are frequent, the clinical diagnosis is not sufficiently discriminatory. Because double infections are not uncommon, the initial management may need to be directed at both diseases.

DIAGNOSTIC TIPS

- Darkfield microscopy, if available, is most helpful if syphilis is being considered.
- A negative darkfield does **not** eliminate the diagnosis of syphilis. A negative examination in primary syphilis may be secondary to inappropriate collection technique (see **Appendix A: Darkfield Microscopy for Syphilis**), an old, healing chancre, local antibiotic treatment applied to the chancre prior to obtaining the specimens, and/or superinfection of the chancre. **A negative darkfield examination should be repeated within seven days.**
- If bright- and darkfield microscopy and the clinical findings are not helpful, evaluate the woman's partner -- if at all possible. **Two histories and examinations are better than one in the case of genital ulcers and buboes.**
- Lymph nodes which are fluctuant and significantly enlarged probably are buboes. In this setting, chancroid or LGV is most likely. If, in addition, a painful ulcer is present, chancroid is the most likely of the two.
- Enlarged fluctuant buboes should be aspirated with a large bore (18 gauge needle) through **healthy adjacent skin** to avoid developing draining sinuses and/or abscesses. (See **Appendix C: GTI Treatment Guidelines**, for details on determining when the bubo is ready for draining.) If your facility is not equipped to handle this procedure, the client should be referred.
- If ulcers are chronic, consider biopsy for possible malignancy; also consider scabies, fixed drug eruption or pyoderma.

TREATMENT

(See Appendix C: GTI Treatment Guidelines.)

WHEN TO REFER

- If the condition is **not** improving after treatment.
- If the history or presentation of the genital lesion(s) is too atypical.
- If the darkfield examination is negative in a client with characteristic lesions (chancre) of primary syphilis, he/she needs serologic testing, i.e., with a non-treponemal test such as the Rapid Plasmin Reagent (RPR) test.

Generally, other diagnostic tests are not useful for initial treatment decision. When available, Giemsa stain for *C. granulomatis* (donovanosis) or cultures (*H. ducreyi*) may provide additional information which may lead to a more disease-specific treatment approach at the initial or follow-up visit. (Details for performing these tests are provided in Appendix A: Diagnosis of GTIs)

- If superinfected genital ulcers and/or buboos are accompanied by fever.
- If the clinic is not equipped to aspirate enlarged, fluctuant buboos.

FAMILY PLANNING CONSIDERATIONS

- Contraceptive methods rarely interfere with the diagnosis and treatment of genital ulcers.
- Clients with genital ulcers should be urged not to have sexual relations until the ulcers (and buboos) have completely healed.
- In clients with genital ulcers, an IUD should **not** be the first choice for contraception because of the risk of exposure to other GTIs.

HEALTH EDUCATION

- Educate clients about the seriousness of syphilis: if untreated it may affect the unborn child.
- All partners of clients with syphilis should be traced, examined and treated, even if no symptoms or signs are apparent. Give the client a treatment card for all partners.
- With herpes there is no effective treatment. Counsel clients to expect recurrences. They should have no sexual intercourse while lesions are present.

- Emphasize the importance of completing the course of treatment, especially for syphilis and LGV. If inadequately treated, the lymph nodes in clients with LGV may be destroyed leading to permanent genital elephantiasis.
- Clients with vulvar or vaginal lesions should not douche because it may irritate the sores. Furthermore, if the sore is superinfected, douching may contribute to the upward migration of pathogens resulting in an upper genital tract infection (PID).
- Educate clients about the need to use condoms and spermicides to avoid GTIs.

REFERENCES

World Health Organization (1984). "Simplified approaches for sexually transmitted disease (STD) control at the primary health care level." Working Group Report, WHO/VDJ/85.437, Geneva.

EIGHT

LOWER ABDOMINAL PAIN: PELVIC INFLAMMATORY DISEASE (PID)

DEFINITION

Pelvic inflammatory disease is a general name for pelvic infections in women (e.g., salpingitis, endometritis, parametritis, oophoritis, pelvic peritonitis) caused by microorganisms which generally ascend from the lower genital tract and invade the endometrium, the Fallopian tubes, the ovaries and the peritoneum (WHO, 1984).

BACKGROUND

Women may present at a family planning or health care facility with a history of lower abdominal pain. This finding should alert one to the possibility of an upper genital tract infection, such as salpingitis or endometritis. These infections are often grouped together under the category of pelvic inflammatory disease (PID).

GTIs that commonly cause PID in women include the following:

- Gonorrhea
- Chlamydia
- Anaerobic bacteria

These infections can cause extensive damage to the pelvic organs and are a major cause of infertility, recurrent infection, ectopic pregnancy and chronic pain. Complications, such as tubo-ovarian abscess or ectopic pregnancy, require major surgical procedures and may cause death. In addition to GTI-related PID, postpartal and post-abortion ascending infections also can occur and are usually a consequence of poor hygiene and/or lack of good obstetrical or gynecological care (WHO, 1984).

Every effort should be made to prevent these infections. Once the infection has developed, every effort should be made to treat it adequately. One means of preventing such infections is through the use of condoms. Condoms act as a barrier and can prevent the female from acquiring those organisms associated with PID. Thus, condoms should be recommended to all clients who are felt to be at risk for sexually transmitted GTIs. A good rule would be as follows: Any client who answered "yes" to any of the questions listed in the screening history (**Chapter 3**) should be advised to use condoms. Condoms are most important for those who are at risk for GTIs and who choose to use an IUD.

Before effective treatment can be initiated, an accurate diagnosis must be made. In this chapter, a flowchart has been developed to guide the clinician in arriving at the correct diagnosis.

Flowchart Five: Pelvic Inflammatory Disease

SYMPTOMS (HISTORY)

Symptoms suggestive of PID include a history of:

- Mild to severe abdominal pain (usually bilateral and suprapubic) which may worsen before menses
- Fever
- Vaginal discharge
- Pain with sexual intercourse

Lower abdominal pain, especially if mild and/or poorly localized, may be due to multiple causes. To help determine whether or not this complaint is associated with a gynecologic problem, it is important to take a detailed menstrual history. Key questions are:

- When was the last menstrual period?
- Was it normal for you?
- When was the previous menstrual period?
- Have you had this type of pain before? If so, does it occur at any special time in your cycle?

The last question may be helpful in deciding whether or not the lower abdominal pain (discomfort) is due to a nonserious condition: mid-cycle pain (mittelschmerz) associated with ovulation.

Remember: Some women who are pregnant may continue to have regular menses.

To rule out other causes, be sure to ask about:

- Symptoms of pregnancy (especially ectopic) or abortion. **Remember:** Women who are at high risk for PID are also at risk for pregnancy, especially ectopic -- **THINK ECTOPIC.**
- Symptoms suggestive of gastrointestinal disease (diarrhea, nausea, vomiting, cramping with bowel movements)
- Symptoms of urinary tract infection (frequency, urgency, burning on urination)

- Similar symptoms in the past
- Symptoms of a possible surgical emergency (gastrointestinal obstruction, appendicitis, etc)

SIGNS (PHYSICAL EXAMINATION)

Acute PID is defined as a condition in which the client has all three of the following clinical findings:

- Lower abdominal tenderness, with or without rebound tenderness
- Cervical motion tenderness (CMT) on bimanual examination, which may be mild or severe
- Suprapubic and/or adnexal tenderness on bimanual examination, which may be mild and unilateral or bilateral

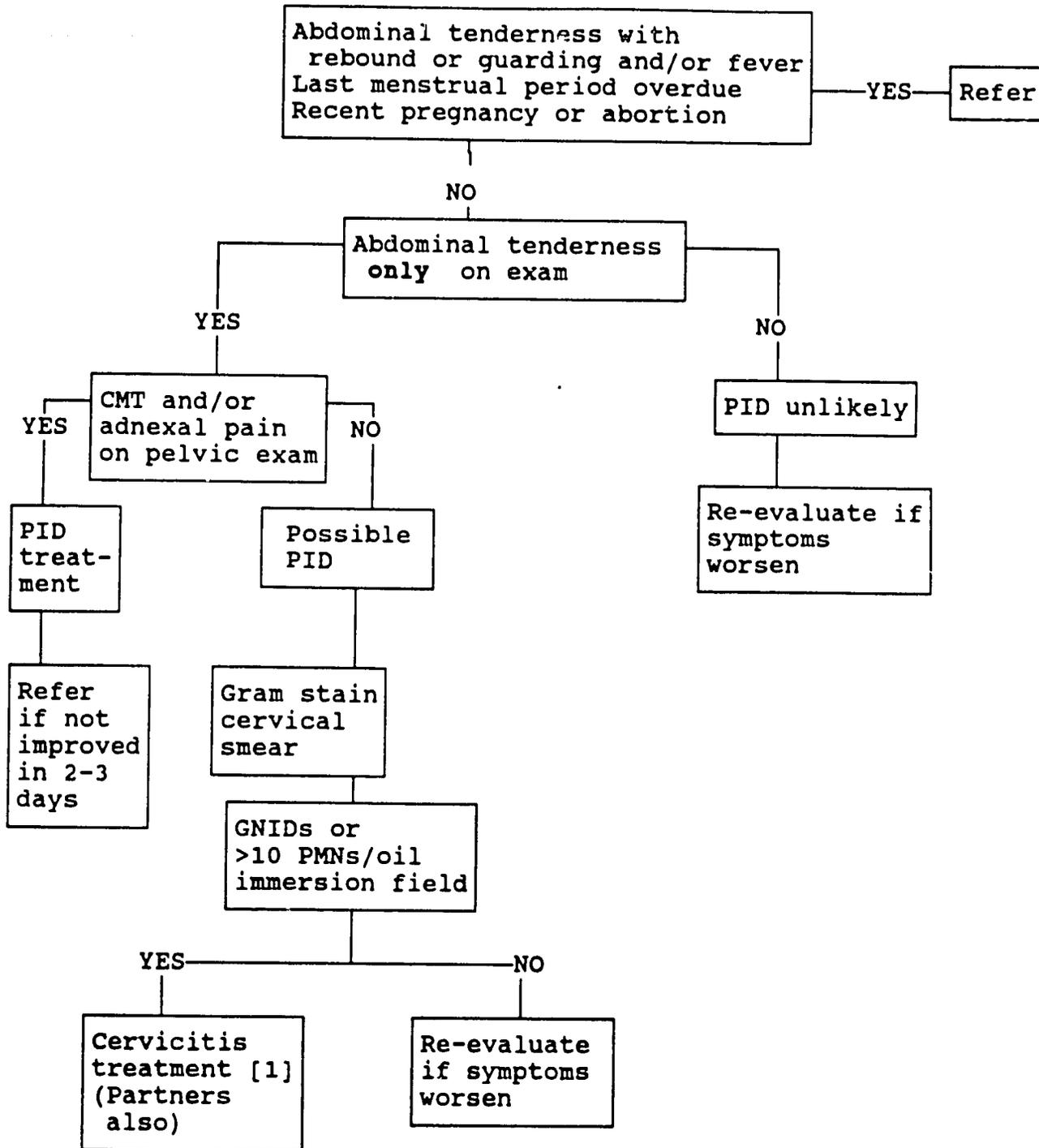
The above findings plus one or more of the following strongly suggest acute PID:

- Vaginal discharge (cervicitis or urethritis)
- Presence of an IUD
- Fever $\geq 38^{\circ}\text{C}$
- GNIDs on cervical smear
- Presence of adnexal or cul de sac mass.

DIAGNOSTIC TIPS

- Gram-negative intracellular diplococci (GNIDs) on a cervical smear suggest gonococcal PID; absence of GNIDs in the presence of > 10 PMNs per oil immersion field is suggestive of nongonococcal cervicitis (NGC), which may be due to chlamydia (see Appendix A: Gram Stain).
- If the clinical findings are consistent with a diagnosis of acute PID, treat for both gonorrhea and chlamydia. In general it is better to over-diagnose and treat milder or questionable cases.
- Women with mild symptoms and signs of PID and negative cervical smear findings (no GNIDs and < 10 PMNs per oil immersion field) should be re-evaluated if symptoms persist or worsen.
- Women who are found to have acute PID must be followed closely until the infection begins to resolve. Treatment should begin immediately, and clients should be seen within

FLOWCHART FIVE PELVIC INFLAMMATORY DISEASE



CMT: Cervical motion tenderness
 GNIDs: Gram-negative intracellular diplococci
 PMNs: Polymorphonuclear white blood cells

[1] See Chapter 4 and Appendix C: GTI Treatment Guidelines

three days following initiation of treatment. If they are not improved, they should be referred to a facility which manages more complicated cases.

- Clients being treated for PID or being evaluated for PID should avoid the use of IUDs. If an IUD is in place and PID is diagnosed, the IUD should be removed and another form of contraception started.

TREATMENT

(See Appendix C: GTI Treatment Guidelines.)

WHEN TO REFER

- Women with a history of lower abdominal pain should be referred if they have the following:
 - Abdominal pain with guarding or rebound (suggests surgical emergency)
 - Menses overdue (suggests possible ectopic pregnancy)
 - Recent pregnancy or abortion (client may need suction curettage)
 - Pelvic mass (suggests pelvic abscess which may require drainage)
 - Fever of 38°C or higher (client needs intravenous fluids and systemic antibiotics)
- Women being treated for acute PID should be referred if they do not improve within two to three days of starting treatment.

FAMILY PLANNING CONSIDERATIONS

- IUDs should not be used in women with a documented recent (3-6 months) history of PID, septic abortion or postpartum uterine (endometritis) infection; multiple sex partners; or treatment for infectious cervicitis (gonorrhea or chlamydia).
- Women with trichomonal vaginitis are at increased risk of acquiring other types of GTIs. As such, they should be counseled that IUDs may be more risky (i.e., IUDs should not be their first choice as a contraceptive method).
- Women with documented PID are at a greater risk of ectopic pregnancy following recovery and should use highly effective contraception, such as oral contraceptives, injectables or Norplant^R implants (if available).
- Family planning clients should be advised that no method of birth control will totally eliminate the risk of developing PID; however, barrier methods such as condoms, when used

consistently and properly with spermicides, provide the best protection and reduce the risk of acquiring those pathogens associated with PID.

- Oral contraceptives are associated with reduced rates of PID, in part because the thick, tacky cervical mucus and decreased menstrual bleeding accompanying pill use reduces the likelihood of upward ascent of pathogens.

HEALTH EDUCATION

- All partners of women with PID must be contacted, examined and treated.
- Women should avoid sexual activity while being treated for PID.
- Because women who have had PID are at greater risk of having an ectopic pregnancy, they should be advised to:
 - Use highly effective contraception or consider voluntary sterilization if they desire no more children.
 - Report immediately to a health care facility if their menses is ever delayed and they were at risk for pregnancy during that particular month.
- Recurrences of PID symptoms (e.g., abdominal pain) are frequent and do not necessarily imply reinfection. However, each episode must be evaluated and treated based on the clinical situation and microscopic findings.
- Educate clients with PID and their partners about the need to use condoms and spermicides once they have recovered.

REFERENCES

World Health Organization (1984). "Simplified approaches for sexually transmitted disease (STD) control at the primary health care level. Working Group Report, WHO/VDJ/85.437, Geneva.

SWOLLEN SCROTUM

DEFINITION

GTI-related infection of the testes (orchitis) and/or epididymis (epididymitis) is characterized by an increase in the volume of the scrotal sac, accompanied by edema and erythema; and sometimes is associated with pain, urethral discharge or urinary tract symptoms (e.g., frequency and/or dysuria) (WHO, 1984).

BACKGROUND

Epididymitis is a severe infection in the coiled tube (epididymis) leading from the testis to the spermatic cord and testes (orchitis) which, if not treated appropriately, may lead to infertility. In young men coming to a family planning or health care facility with **no history of trauma**, testicular torsion and epididymo-orchitis are the most common causes for the acute onset of unilateral or bilateral lower abdominal/scrotal pain and swelling.

Epididymo-orchitis is due to either:

- Infection with a sexually transmitted GTI (gonorrhea or chlamydia and rarely syphilis or M. tuberculosis)
- Infection with Gram-negative bacilli such as E. coli or pseudomonas species.

A swollen and/or tender scrotum in postpubertal males also may be due to mumps orchitis.

Before effective treatment can be initiated, an accurate diagnosis must be made. In this chapter, a flowchart has been developed to guide the clinician in arriving at the correct diagnosis.

Flowchart Six: Epididymo-Orchitis

SYMPTOMS (HISTORY)

If there is **no** history of trauma and testicular torsion or mumps are **not** suspected, epididymo-orchitis becomes the most likely diagnosis. Those men having a sexually transmitted GTI as the cause for their epididymitis typically will:

- be less than 35 years of age,
- be sexually active with a recent history of urethritis or penile discharge, and
- almost always have unilateral pain with a relatively acute onset.

By contrast, men who have epididymitis secondary to a urinary tract pathogen such as E. coli and Pseudomonas aeruginosa, usually:

- are over 35 years of age,
- have a history of previous urologic problems -- infections or instrumentation, and
- have no history of prior urethritis.

SIGNS (PHYSICAL EXAMINATION)

GTI-related epididymo-orchitis is usually unilateral. The scrotum may appear red and edematous and is tender to palpation. Evidence of urethral discharge should be sought when these findings are present.

DIAGNOSTIC TIPS

- The history, urethral Gram stain findings, and urinalysis results are important in separating men who have epididymitis secondary to a sexually transmitted GTI from those having urinary tract infections (UTIs).
- Finding Gram-negative intracellular diplococci (GNIDs) and/or ≥ 10 PMNs per oil immersion field on urethral smear supports the diagnosis of gonorrhea or NGU (presumably chlamydia) as the etiologic agent(s) (see **Appendix A: Gram Stain**).
- Findings of pyuria (>5 PMNs per oil immersion field) and bacteria (1-2 bacilli per oil immersion field) on a methylene blue or Gram stain of an uncentrifuged (unspun), mid-stream urine specimen strongly suggests E. coli or other urinary tract pathogen as the cause for the epididymo-orchitis (see **Appendix A: Urine Microscopy**).

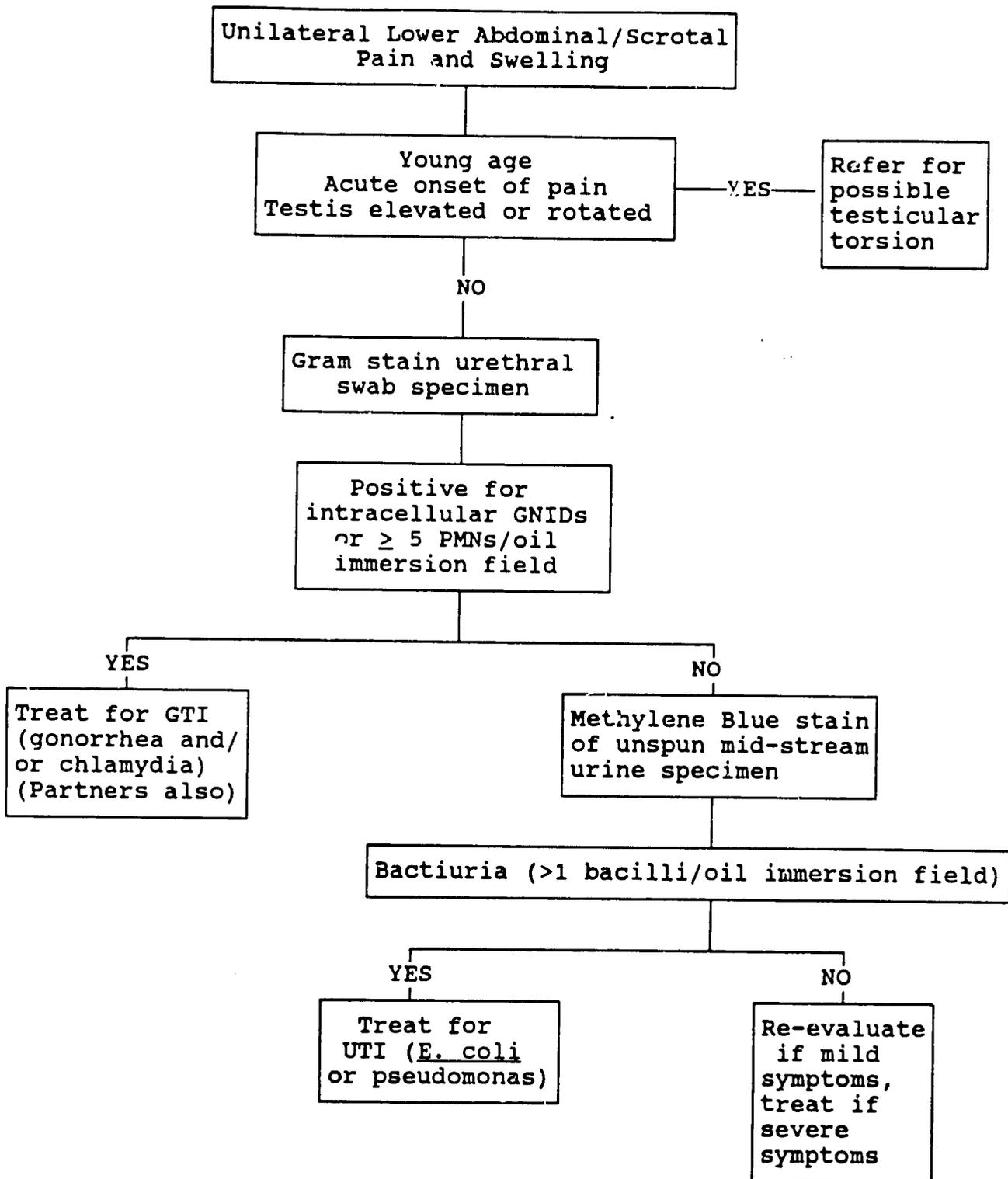
TREATMENT

(See **Appendix C: GTI Treatment Guidelines**.)

Epididymo-orchitis should be managed with antibiotics, symptomatic treatment, and supportive measures. Because of the high frequency of underlying urethral infection, urethral discharge treatment may be indicated.

FLOWCHART SIX

EPIDIDYMO-ORCHITIS



GNIDs: Gram-negative intracellular diplococci
 PMNs: Polymorphonuclear white blood cells
 UTI: Urinary tract infection

WHEN TO REFER

- Males with acute onset of excruciating testicular/scrotal pain who are suspected of having torsion of the testis should be immediately referred.
- Clients strongly suspected of having epididymitis but with negative urethral and urinary microscopic findings should be referred.
- Clients who have not improved following 2-3 days of antibiotic treatment should be referred.

FAMILY PLANNING CONSIDERATIONS

- Epididymo-orchitis caused by a GTI (gonorrhea or NGU) is a serious infection. Infarction of the testis can occur and if bilateral can result in infertility. Also, infertility due to bilateral epididymitis can occur secondary to epididymal obstruction.
- Men with a history of GTI-related epididymo-orchitis should use condoms to minimize the risk of re-infection. They should avoid intercourse during treatment and until symptoms (pain and urethral discharge, if present) are gone.

HEALTH EDUCATION

In men with sexually transmitted epididymo-orchitis, discuss:

- The risks of multiple sexual partners
- The use of condoms to avoid reinfection
- The need to identify, examine and treat all contacts
- The importance of completing a course of treatment
- The possibility of infertility if the infection was bilateral

REFERENCES

World Health Organization (1984). "Simplified approaches for sexually transmitted disease (STD) control at the primary health care level." Working Group Report, WHO/VDJ/85.437, Geneva.

TEN

GENITAL SKIN CONDITIONS

BACKGROUND

Non-ulcerative genital skin lesions often are caused by sexually transmitted GTIs such as:

- Genital warts (condyloma acuminata)
- Molluscum contagiosum virus
- Pubic lice (Phthirus pubis, the crab louse)
- Scabies (Sarcoptes scabiei, the itch mite)

However, other nonsexually transmitted skin conditions also can cause genital skin lesions (e.g., fungi such as tinea or candida species). Thus, the clinician must be able to distinguish one lesion from another to effectively treat the client and prevent transmission of infection to contacts.

Epidemics of infestations by lice and scabies typically are associated with poverty, poor personal hygiene and overcrowding. Although infestation occurs by intimate personal contact, usually sexual, casual contact with persons having a high parasite load such as clients with crusted scabies, can result in infestation.

SYMPTOMS (HISTORY) AND SIGNS (PHYSICAL EXAMINATION)

A detailed history is important in determining the cause of the client's lesions or rash. The history should include questions about systemic disease, family history and use of drugs. (When several members of a family complain of an itchy eruption over the whole body, scabies is a likely diagnosis.)

Important features to consider in distinguishing various GTIs causing nonulcerative skin conditions are:

- The appearance and distribution of the lesions
- Whether the lesions are confined to the genital area or are in nongenital areas, such as between the fingers and toes
- Do the lesions itch
- How long have symptoms been present

Unfortunately, in some cases the response to therapy may be the only means of confirming the diagnosis.

DIAGNOSTIC TIPS

In this section the clinical features and criteria for establishing the diagnosis are described for each of the four GTIs causing genital skin infections. (See **Appendix B: Basic Facts About GTI** for additional information.)

- **Condyloma Acuminata:** Genital and anal warts are caused by human papilloma virus (HPV), a slow-growing (9 to 12 months incubation) small DNA virus belonging to the papovavirus group.

Typical lesions present as single or multiple, soft, "cauliflower" growths which are painless and located around the anus, vulvovaginal area, penis, urethra and perineum. The so-called "flat" condyloma of the cervix, when treated with vinegar (dilute acetic acid), appear as "acetowhite" lesions visible to the naked eye. These lesions also occur on the external genitalia.

A presumptive diagnosis usually is made on the basis of the typical clinical presentation. Syphilis always should be excluded by obtaining a darkfield examination or serology (see **Appendix A: Darkfield Microscopy and the RPR test**). Atypical or persistent lesions should be biopsied or referred to confirm the diagnosis and to exclude neoplasia. Recently, certain types of HPV have been found to be associated with the presence of cervical dysplasia and cancer. Whether or not HPV causes cervical neoplasia will require additional studies (Schiffman, 1990).

- **Molluscum Contagiosum:** This mild genital skin condition is caused by the molluscum contagiosum virus, a poxvirus. This GTI is not always transmitted through sexual contact but may be spread through use of a contaminated towels and close body contact from person to person.

In adults the characteristic lesions, which are small, pinkish umbilicated (punched-out) papules, are most often located on the lower abdomen, pubis, external genitalia and inner thighs. When compressed, a firm white "pearl" is expressed, usually followed by a small amount of bleeding.

When typical lesions are present, the diagnosis is usually obvious clinically. However, for confirmation in equivocal cases, the core ("pearl") can be expressed on to a slide and examined by brightfield microscopy for classic intracytoplasmic inclusions, the so-called "molluscum bodies" (see **Appendix A: Direct Smears**).

- **Pediculosis Pubis:** This GTI is caused by the crab louse (*Phthirus pubis*), a parasite which is 1-4 mm long with a segmented body, pointed head and claws used to cling to hairs. Lice often infest those individuals with poor hygiene, crowded living conditions and multiple sex partners.

Usually infestation is confined to the pubic hairs and around the anus. However, pubic lice also can infest the eyelashes, axilla and other hairy body parts. Symptoms in an individual infested with crab lice range from mild to severe itching.

A presumptive diagnosis of pediculosis is made when a client presents with a recent history of exposure and has itchy papules or excoriations (scratches) in the genital area. The diagnosis can be confirmed by finding lice or nits attached to genital hairs and examining them microscopically (see **Appendix A: Microscopy for Lice and Scabies**).

- **Scabies:** The infectious agent of this parasitic GTI is a mite, *Sarcoptes scabiei*, which is 0.3-0.4 mm long. The female mite on contact with human skin can burrow beneath the surface within 2-3 minutes, leaving a characteristic track. The tiny burrows (tracks) containing the mite and eggs may appear as well-defined papules or vesicles. Typically the lesions are most prominent between the webs of the fingers.

In both sexes lesions are located anywhere on the external genitalia, and in women the nipples may harbor mites. Symptoms include intense itching; this may cause excoriations (scratched areas of skin) which subsequently may become secondarily infected if hygiene is poor.

The diagnosis often can be made on clinical grounds alone. A history of exposure to a person with scabies also helps support this diagnosis. A definitive diagnosis is made by microscopic identification of the mite and its eggs, larvae or feces from a scraping of a non-excoriated lesion (see **Appendix A: Microscopy for Lice and Scabies**).

TREATMENT

(See **Appendix C: GTI Treatment Guidelines**)

WHEN TO REFER

- Clients with persistent or progressive infection despite apparently appropriate treatment should be referred.
- Women with genital warts (human papilloma virus) possibly involving the cervix should be referred for evaluation to confirm the diagnosis and to exclude possible cervical dysplasia or cancer.

FAMILY PLANNING CONSIDERATIONS

Generally speaking, GTIs causing genital skin conditions do not affect an individual's choice or use of a particular family planning method. Even women with venereal warts (HPV) involving the cervix can still continue to use oral contraceptives (OCs) and IUDs. As with other GTIs, clients should be advised to use condoms and spermicides if they have multiple sex partners, and refrain from sexual activity while they and their partner(s) are being treated for a GTI.

HEALTH EDUCATION

Discuss with the client:

- The risks of multiple sexual partners
- The need to use condoms and spermicides to avoid GTIs
- The importance of completing a course of treatment
- The need to return if the condition does not improve and /or worsens

REFERENCES

Schiffman, M (1990). "Physicians still divided over clinical role of papilloma virus DNA testing." Ob. Gyn. News 25: No. 22

APPENDIX A
DIAGNOSIS OF GTIs

CONTENTS

Introduction

Section One: Standard (Brightfield) Microscopic Procedures

Saline and KOH Wet Mounts, Vaginal pH
Gram Stain
Urine Microscopy
Direct Smears
 Syphilis
 Herpes (Tzanck preparation)
 Chancroid
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 Molluscum Contagiosum
Microscopy for Parasites

Section Two: Additional Procedures

Darkfield Microscopy for Syphilis
Rapid Plasma Reagin Test (RPR)

Section Three: Reagent Preparation

Normal Saline (0.85% NaCl)
10% KOH
Gram Stain
Methylene Blue Stain
Wright Stain
Giemsa Stain

INTRODUCTION

Presumptive diagnosis of most microorganisms causing GTIs can be made using microscopy. All procedures in this manual can be done with a microscope adapted for darkfield use or with other equipment commonly found in a family planning clinic. The procedures are simple to do and can be easily performed in the clinic by the clinician. For each procedure, step-by-step instructions and guidelines for interpreting the results are given.

Listed in Table A.1 are the materials and equipment needed to:

- Examine the client
- Collect the specimens
- Perform the indicated procedures

To obtain the best results, each procedure must be performed in a precise, standardized manner, using appropriately prepared specimens. To facilitate learning, not only are the procedures described in detail, but also representative drawings, which serve to further illustrate technical aspects, are provided.

Remember: As with all technical skills, the more frequently the procedure is performed, the better the quality of results.

TABLE A.1
Materials and Equipment Needed to Perform GTI Evaluations

Examining the Client

Females

Vaginal Specula (small, medium and large)
Examining table with stirrups

Both

Privacy
Good light source
Disposable gloves or reusable gloves that have been disinfected (high-level) and checked for holes

Specimen Collection

Vaginal and Cervical

Cotton or dacron swabs (plastic and wooden handled)
Ayre's wooden spatula
Large (proctoscopy) swabs

Urethral

Wire-handled (small) swab

Skin Lesions

Scalpel blade and/or small gauge needle for scraping

All

Glass microscope slides
Coverslips

Equipment and Supplies

Bench or table (30 x 48 inch surface dimensions)
Sink with water source and staining tray
Paper towels or blotting paper
Alcohol or Bunsen burner
Brightfield microscope (darkfield assembly recommended)
Immersion oil
Lens paper and lens cleaner
Medicine bottles (30 ml) with eye dropper
Syringes, 1- or 2-ml
Needles, 18- and 20-gauge

Chemicals and Reagents

Potassium hydroxide (KOH) solution, 10% (tightly capped)
Isotonic saline solution (tightly capped or freshly prepared)
Gram stain reagents: crystal violet, Gram's iodine acetone, 95% ethanol, safranin
pH paper (4-7)
Methylene blue stain (0.3%)
Wright stain reagents: Wright stain powder, glycerol, 100% methanol, acetone and 1/15M phosphate buffer, distilled water
Giemsa stain reagents: Giemsa stain powder, glycerol, 100% methanol, distilled water

Additional (Recommended)

Serologic test for syphilis (RPR)

SECTION ONE:

BRIGHTFIELD MICROSCOPIC PROCEDURES

SALINE AND KOH WET MOUNTS, VAGINAL PH

Use: Rapid detection of Trichomonas vaginalis, "clue cells" associated with bacterial vaginosis (wet mount) and Candida (KOH mount); in addition the "fishy" (amine-like) odor after KOH ("Whiff" test) and the finding of a vaginal pH greater than 4.5 also are indicative of bacterial vaginosis.

Materials: 3 microscope slides
Coverslips
Test tube with 1 ml normal saline (0.85 gm% NaCl in H₂O)
10% KOH
pH paper with range of 4 to 7 and color scale
2 cotton-tipped swabs
Brightfield microscope

Specimen Collection

Vaginal pH

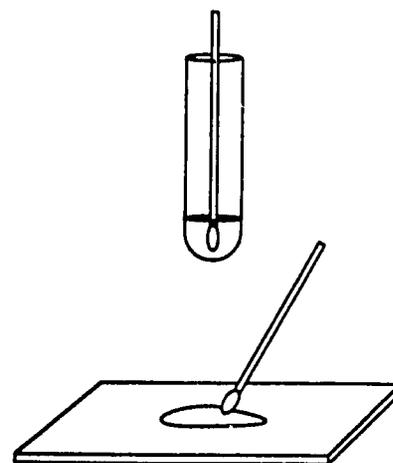
Place a cotton-tipped swab directly in the vaginal secretions to absorb the fluid. Apply swab directly to pH paper, then determine pH using the color scale. Following this, the swab is used for the saline wet mounts.

Saline Wet Mount

STEP 1. Immerse swab with absorbed vaginal secretions into 1 ml of warm (room temperature or higher) normal saline in a small test tube.

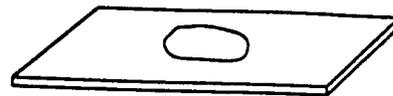
STEP 2. Suspend secretions in saline by stirring with the cotton swab for a few seconds.

STEP 3. Place 1-2 drops of the normal saline wet mount on a glass slide and place a coverslip over it — read immediately.



Alternatively, for a "quick" check of the vaginal discharge, the saline wet mount can be prepared as follows:

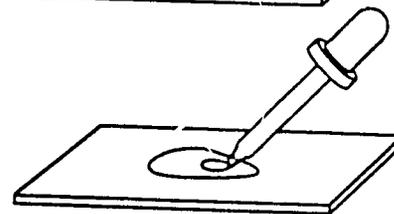
STEP 1. Place one drop of the vaginal discharge on a slide.



STEP 2. Using a clean stick or cotton-tipped applicator, stir the specimen until it is smooth.



STEP 3. Add one drop of normal saline (0.85% NaCl in water) to the specimen.



STEP 4. Place a coverslip on the slide and examine at once under low power (10X).



With either method of preparing the saline wet mount, first scan the entire area under the coverslip at low power (10X) with the condenser racked down to lower the light and intensify the contrast. Examine at least five different "suspicious" areas of the slide under high dry power (40X). Save the test tube for repeat wet mount, the KOH mount and Gram stain, if necessary.

KOH Mount

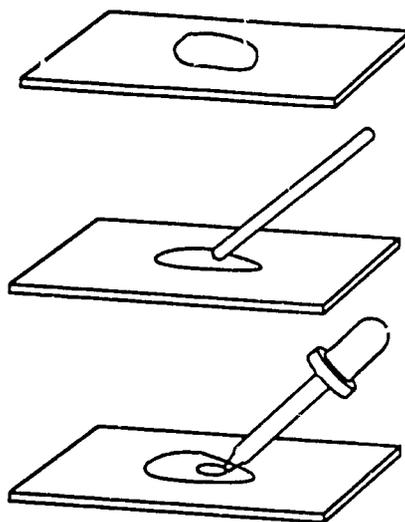
Add one drop of fluid from the test tube containing the saline-diluted vaginal fluid to a clean, dry slide, then add one drop of 10% KOH and sniff ("whiff" test) the specimen. The "whiff" test is positive if a "fishy" (amine) odor is detected when the KOH is applied to vaginal secretions containing large numbers of bacteria or trichomonads. Following the KOH "whiff" test, a coverslip should be placed over the specimen and the KOH slide viewed immediately at low and high dry power with the condenser racked down (low light).

Again, for a "quick" method of preparing the KOH slide:

STEP 1. Place one drop of the vaginal discharge on a slide.

STEP 2. Using a clean stick or cotton tipped applicator, stir the specimen until it is smooth.

STEP 3. Add one drop of 10% KOH to the specimen and sniff ("Whiff" test); then stir briefly, carefully place a coverslip over the mixture and examine microscopically.



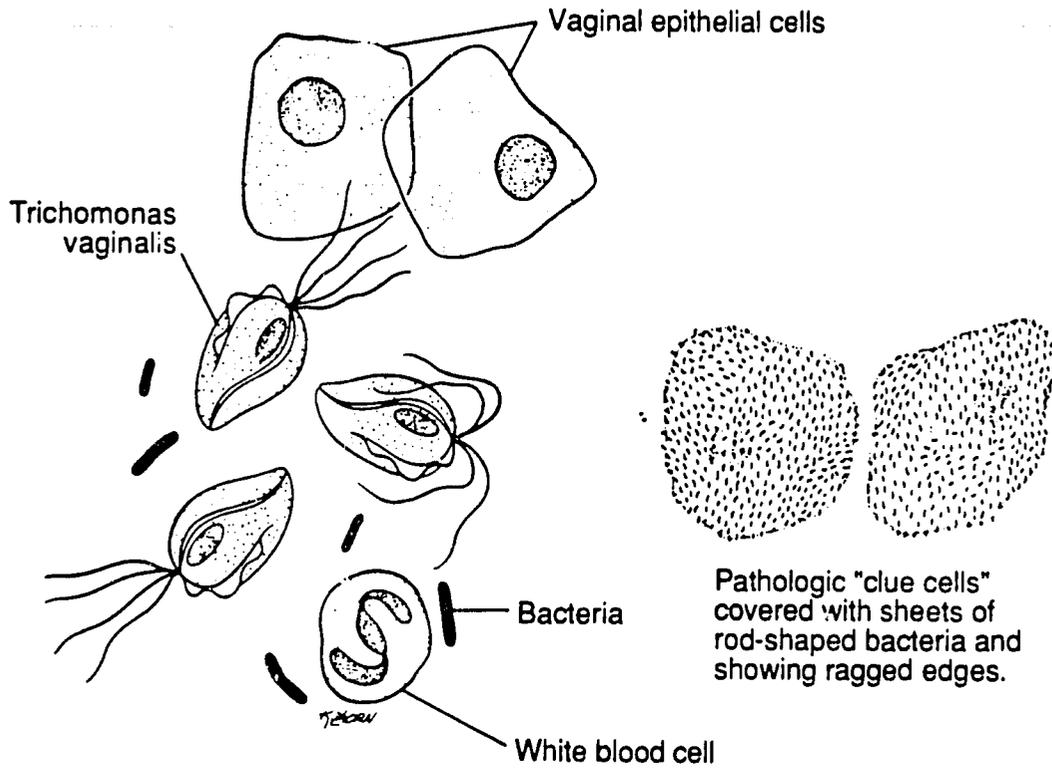
Microscopic Appearance

Besides identification of specific organisms as described below, microscopic examination should include attention to the presence of other characteristics of the specimen (e.g., the number of polymorphonuclear leukocytes (PMNs) per oil immersion field in relation to the number of vaginal epithelial cells; whether lactobacilli (long, thin Gram-positive rods) or coccoid bacteria predominate; the occurrence of clue cells, etc).

Trichomoniasis: When viewed under a microscope, trichomonads are identified by their characteristic jerky movements. T. vaginalis is a clear, pear-shaped organism about the size of a pus cell. (See figure below)

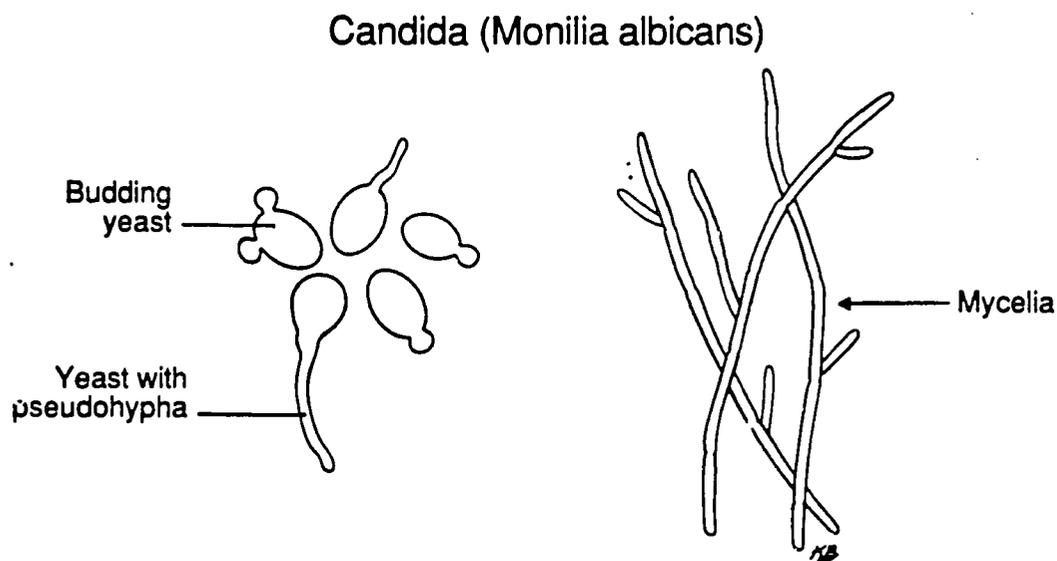
Bacterial vaginosis: Although not all causes of bacterial vaginosis are known, Gardnerella vaginalis usually is the predominant microorganism. The presence of more than 20% "clue" cells on a wet mount preparation is suggestive of bacterial vaginosis. "Clue" cells are irregularly bordered squamous epithelial cells whose cell outlines are obliterated by sheets of small, rod-shaped bacteria. "Clue" cells are seen in saline, not KOH mounts.

Secretions Prepared with Normal Saline



Candida (Monilia Albicans): Budding yeast cells are often seen under low or high dry power. Budding yeast cells may be present in the vagina of non-infected women (normal vaginal flora). By contrast, hyphae (the mass of long, tubular filaments) are seen only with yeast vaginitis.

Secretions Prepared With Potassium Hydroxide (KOH)



Source: Family Planning Procedure Manual for Nurse-Midwives. New York, Downstate Medical Center, State University of New York, 1982.

Interpretation

Trichomonads and "clue" cells are seen only in the saline wet mount; they are lysed by KOH.

T. vaginalis vaginitis

Positive: The presence of even one motile organism is diagnostic. Actively motile trichomonads are easily seen on low power (10X). High dry power (40X) is necessary to detect less vigorously moving organisms when only the flagella may be moving. Numerous PMNs often are present.

Bacterial Vaginosis

Positive: >20 "clue" cells high dry power (40X) field and few or no PMNs seen.

Yeast (Candida) vaginitis

Saline Wet Mount: Epithelial cells may obscure yeast, but pseudohyphae and budding yeast cells are sometimes visible. PMNs may or may not be present.

KOH Wet Mount: Budding yeast and branching pseudohyphae with buds are more easily seen because epithelial cells, RBCs and PMNs have been lysed. Use low power (10X) to scan for yeast and confirm on high dry power (40X).

The saline and KOH wet mounts are important clinical tests to determine the presence of vaginal infections. For the diagnosis of trichomonas vaginitis, the saline wet mount carries a sensitivity of 70%. For the diagnosis of candida vaginitis, the KOH wet mount has a sensitivity of 50% (Stamm et al, 1988).

Sources of Error

The following errors in technique will decrease the sensitivity of saline wet mount and KOH mounts.

- Collection of the specimen from the endocervix
- The use of cool saline or saline which has become hyperconcentrated due to evaporation
- Delay in reading the slide
- Contamination of the saline wet mount with KOH
- "Sloppy" preparation with too much saline, causing material to move rapidly across the field
- Making a preparation too thick
- Failure to read the slide with condenser racked down
- Examination of only a small areas of the slide

GRAM STAIN

Use: Rapid detection of Neisseria gonorrhoea in the assessment of cervicitis and urethritis; also useful in determining number of polymorphonuclear cells (PMNs), yeast and microbial flora suspected in bacterial vaginosis and urine specimens (cystitis).

Materials: 2 microscope slides
2-4 large cotton swabs
2 small cotton-tipped swabs (cervical specimen)
2 wire-handled cotton-tipped swabs (urethra specimen in males)
Gram stain reagents
Sink or stain tray with water source
Heating source (alcohol or Bunsen burner)
Paper towels and blotting paper
Brightfield microscope

Specimen Collection

Cervix: Using the large cotton swab, carefully clean the cervix of all vaginal secretions. Place a smaller cotton-tipped swab in the endocervical os and rotate it 2-4 times. Remove the swab after 10 seconds.

Urethra: Clients should not urinate for at least two hours before the specimen is collected.

In the female, if vaginal discharge is present at the opening of the urethra, remove it with a large cotton swab before proceeding. Next, carefully press on the urethral area just behind the urethral opening (os); collect any secretions on a wire-handled cotton-tipped swab. If no secretions are obtained, carefully insert the cotton-tipped swab about 1 cm into the urethra, rotate it and hold for 10 seconds before removing.

In the male, first milk down the penis and if secretions are obtained, collect them on a cotton-tipped swab. If no secretions are present, carefully insert the small, wire-handled cotton-tipped swab 1-2 cm into the penis (urethral os) and slowly rotate, making sure the swab is in contact with the urethral wall; remove after 10 seconds.

Preparation of the Slide

STEP 1. The specimen is transferred immediately onto a glass slide where a thin and even smear is made by rolling the swab onto the slide. Do not rub the glass slide with the swab or the Gram stain will appear distorted.

STEP 2. The smear is air-dried and heat-fixed by holding the slide, film upwards, in a flame until it feels warm when touched to the back of the hand. Heat-fixed specimens must be allowed to cool before commencing staining.

- STEP 3. Flood the slide with crystal violet (primary stain) for 10-15 seconds, then rinse with water, preferably under a gently running tap.
- STEP 4. Cover the slide with iodine solution for 10-15 seconds, then rinse with water.
- STEP 5. Before the smear has dried completely, decolorize with alcohol/acetone until no more purple color comes off. This step is critical. Overdecolorizing is the most common problem with Gram staining, so be careful.
- STEP 6. Wash the slide gently, but thoroughly with water.
- STEP 7. Flood the slide with Safranin (counterstain) for 10-15 seconds, then wash again with water.
- STEP 8. Allow the slide to air dry before examination under the microscope. Drying may be hastened by pressing blotting paper or a paper towel against the slide. **Do not rub!**

Microscopic Appearance

First scan the smear at low power (10X) to check for proper staining and to locate areas where the cells are. Then use the oil immersion objective (100X) to search for microorganisms and PMNs. When properly prepared, cells, such as squamous epithelial cells, and mucus should stain pink; yeast stains, purple. Bacteria are characterized as Gram positive (purple) or gram negative (pink), and as cocci (round), bacilli (rod shaped), or coccobacilli (in between rods and cocci). Gonococci (see below) are Gram-negative kidney or coffee bean-shaped diplococci, 0.6 to 0.8 micrometers in size. The presence of diplococci within polymorphonuclear leukocyte (PMNs) is strongly suggestive of gonorrhea.

Analyze at least five separate areas on the slide. The best preparations feature an even distribution of the cervical secretions with no vaginal contamination. (Specimens with more than one vaginal squamous epithelial cell per oil immersion field (100X objective) are contaminated and should be interpreted with caution.)

Interpretation

Gonococcal cervicitis

Positive: One or more PMNs with Gram-negative intracellular diplococci (GNIDs).

Nondiagnostic: absence of GNIDs or only extracellular gram-negative diplococci; PMNs may or may not be found.

Although the specificity of the cervical Gram stain in women is greater than 95%, the sensitivity for finding GNIDs is only about 40-60% (Stamm et al 1988). Therefore, repeat examinations may be required in equivocal cases (WHO, 1984).

Nongonococcal (mucopurulent) cervicitis

Positive: Ten or more PMNs per oil immersion field and no GNIDs. 50-60% of clients with these findings will be culture-positive for C. trachomatis (Stamm et al 1988).

Gonococcal urethritis

Positive: One or more PMNs with GNIDs. Distinguish carefully between GNIDs and Gram-negative rods (bacilli).

The sensitivity and specificity of the urethral Gram stain is greater than 98% when compared to culture-proven cases (Stamm et al, 1988).

Nongonococcal urethritis (NGU)

Positive: Greater than or equal to 5 PMNs per oil immersion field and no intracellular GNIDs found. To make this count, examine an area of the smear with many cells and average the number of PMNs seen in three fields.

Depending upon the disease pattern in a particular country, from 30-50% of NGU is due to chlamydia.

Sources of Error

- "Scrubbing," not rolling, the swab across the slide may destroy cellular morphology
- Failure to heat-fix the slide may cause material to wash off during staining
- Overheating the slide may cause staining artifacts and distortion of the cells
- Use of old Gram's iodine solution (shelf life at room temperature about 90 days)
- Over-decolorizing the slide may cause Gram-positive bacteria to appear Gram-negative
- Under-decolorizing the slide may cause Gram-negative bacteria to appear Gram-positive
- Reagents contaminated with bacteria or yeast may give spurious results

Alternative Method for Staining Cervical or Urethral Smears

If Gram staining is not possible, a simpler but less accurate method using Methylene blue (MB) stain may be employed (see below, Urine Microscopy, for details on how to prepare the slide). The microscopic identification of an MB-stained smear requires a good knowledge of the typical appearance of the gonococcus. With MB the gonococcus absorbs the dye and appears deep blue. **Remember:** Be careful not to over-stain the slide as this will lessen the contrast.

URINE MICROSCOPY

Use: Rapid detection of bacteria in urine using methylene blue or Gram stain. Methylene blue staining is faster than Gram stain, but stock solution must be stored at 4°C.

Materials: 2 microscope slides
Coverslips
2-4 large cotton swabs
2 small cotton-tipped swabs (cervical specimen)
2 wire-handled cotton-tipped swabs (urethra specimen in males)
Gram stain reagents
Sink or stain tray with water source
Heating source (alcohol or Bunsen burner)
Paper towels and blotting paper
Pasteur pipets
Methylene blue stain
Brightfield microscope

Specimen Collection

A "clean catch" midstream urine specimen is collected. Appropriate specimen collection is critical. Female clients should be given the following instructions:

- Spread labia. Wash urethral area from front to back with four soaped cloths, one at a time. Then rinse urethral area in the same manner with damp cloths. Void a small amount of urine into the toilet, then continue voiding into the specimen container.
- Clients should not void for two hours prior to specimen collection.

Preparation of the slide

- STEP 1.** Cover the air-dried and heat-fixed smear with methylene blue stain for one minute. **Remember:** Allow heat-fixed specimens to cool before commencing staining.
- STEP 2.** Rinse the slide in water, preferably under a gently running tap.
- STEP 3.** Allow the slide to dry and examine under the microscope. (For Gram stain, see previous section for preparation of slide.)

Interpretation

Examine first with the 10X objective to locate the stained cells, then move to the oil immersion (100X) objective to count PMNs and bacteria. Demonstration of 1-2 organisms (rods) per oil

immersion field usually correlates with a colony count of 10^5 organisms/ml. In clients with urinary tract infection, the bacteria seen will generally be the same type (e.g., all large rods if E. coli).

Finding a variety of bacteria in each field (rods and cocci of different sizes) indicates excessive contamination during collection and the smear must be interpreted with caution.

Quick Methylene Blue Test

For a quick screening test of a clean-voided urine specimen, place one drop of "unspun" urine on a clean microscope slide. Next, add one drop Methylene blue stain (stock solution), stir with a toothpick and place a coverslip over the mixture. Examine microscopically, first at low power and then at high power, looking for deep blue staining bacilli (rods). A positive test is finding one or more rods/high dry field.

Remember:

- A negative test does not exclude infection of the urine (cystitis).
- Finding a variety of bacteria (rods and cocci) of different sizes and/or epithelial cells strongly suggests contamination of the specimen, presumably due to improper collection of the urine specimen.

DIRECT SMEARS

Syphilis (Darkfield Microscopy)

Use: Rapid identification of *T. pallidum* (syphilis) from genital ulcers.

Materials: 3 microscope slides
Coverslips, No. 1 (22x22 mm square)
Normal saline
Moist chamber (Petri disk with moist paper towel)
70% ethyl or isopropyl alcohol
Darkfield-adapted microscope:
Ocular (10X)
Objectives: Low power (10X), high dry power (40X), oil immersion power (100X)
fitted with a funnel stop or built-in iris diaphragm
Condenser: Darkfield immersion or Darkfield (spider) stop
Illuminator, in-base

Safety Precautions

When performing a darkfield examination on a lesion suspected of being caused by syphilitic, take the following precautions:

1. Wear rubber gloves when collecting a specimen from a suspected syphilitic lesion.
2. If gloves become contaminated during the process of taking or examining the specimen, wash with soap and water or with a suitable disinfectant.
3. Do not smoke, drink or eat while taking or examining the specimen.
4. Discard specimen slides with serous exudate oozing from coverslip edges and prepare another specimen with less fluid.
5. If the microscope stage or objectives become accidentally contaminated with fluid from a specimen being examined, clean them immediately with 60-90% ethyl alcohol.
6. Discard slides and any other material used in preparing the specimen into a suitable container of disinfectant; container and contents should then be autoclaved, if possible.
7. Have available at all times 60-90% ethyl or isopropyl alcohol or a comparable disinfectant for use in cleaning areas possibly contaminated by lesion exudate.

Specimen Collection

Remember: Prior to collecting the specimen, the microscope needs to be properly adjusted and aligned for darkfield use. This should be done **before** collecting the specimens (see Section 2: Darkfield Microscopy for Syphilis).

- STEP 1. Clean the lesion in question, using a gauze soaked with normal saline to remove any scab or bacterial debris covering the lesion.
- STEP 2. Gently squeeze the lesion in order to express any exudate from the lesion. The lesion may bleed slightly as a result of this procedure; however, a clear exudate should be collected for the microscopic examination.
- STEP 3. Press the glass slide firmly against the lesion. If the area is moist, no additional saline is needed.
- STEP 4. Immediately place a coverslip over the specimen. Using the above collection procedure, collect two additional slides.
- STEP 5. Place the slides in a moist chamber (large, plastic Petri disk lined with a damp paper towel) to prevent drying of the specimen.
- STEP 6. Examine the specimen immediately, using a properly aligned and adjusted darkfield microscope (see Section 2: Darkfield Microscopy for Syphilis).

Interpretation

- STEP 1. First scan the slide at low power (10X) to locate any cells and debris. Next, go to high dry (40X).
- STEP 2. A good specimen is indicated by the presence of movement of bacterial elements in the specimen. If no movement is present, the sample is too dry and inappropriate for evaluation, and the procedure must be repeated.

Remember: Do not add oil above the coverslip unless a suspected organism is observed (see Section 2: Darkfield Microscopy for Syphilis).

- STEP 3. A positive darkfield is indicated by the presence of motile spiral organisms conforming to the typical characteristics of T. pallidum. These organisms may be visible using the 40X or the oil immersion (100X) objectives. One must search the entire specimen before calling the specimen negative.

(For details regarding differentiation of T. pallidum from other organisms and objects, see Section 2: Darkfield Microscopy for Syphilis.)

Sources of Error

Common reasons for false negative results are that the lesion is:

- Too old
- Treated with topical antibiotic ointments or cremes
- Too dry

Remember: Darkfield examination should not be used for oral lesions (mucus plaques) due to presence of non-pathogenic treponemes in the mouth. By contrast, condyloma lata, a common lesion seen in secondary syphilis, are a rich source of treponemes for darkfield examination. (See Section 2: Darkfield Microscopy for Syphilis for a detailed listing of sources of error due to:

- faulty specimen preparation,
- improper microscopic adjustment and alignment, and
- difficulties in differentiating T. pallidum from other organisms and objects.)

Herpes (Tzanck Smear)

The Tzanck smear is a rapid, easy way to detect Herpes simplex virus (HSV) infections but it has a **low sensitivity**. Only about 50% of herpetic lesions which are culture positive will be positive by this method (Stamm et al, 1988).

Materials: 2 microscope slides
Coverslips
Mineral oil
Sterile scalpel (or lancet)
Wright-Giemsa stain
Brightfield microscope

Specimen Collection

When taking a specimen, collect as many cells as possible from the base of the lesion.

Vesicular or pustular lesions: Unroof lesion with a large gauge needle (18 ga.). Using a sterile saline-moistened swab, abrade base of lesion in order to obtain a good sample of cells.

Crusted lesions: Remove crust and scrape base of lesion with sterile saline-moistened swab. Avoid making the lesion bleed.

Preparation of Slide

STEP 1. Apply cells immediately to a slide and allow to air dry.

STEP 2. Stain with Wright-Giemsa stain as follows:

- Apply Wright stain to the slide for one minute. Add an equal volume of neutral distilled water (pH 7.0), and stain for four minutes.
- Shake off stain; then apply dilute Giemsa stain (1 drop to 1 ml of neutral distilled water), and allow to stain for 15 minutes.
- Shake off, decolorize lightly with ethanol and air dry (do not blot).

Interpretation

Scan the slide under low (10X) power to find cells, then examine under high dry power (40X) and oil immersion power (100X).

Positive: Giant, multinucleated cells which may have a ground glass appearance. **Caution:** similar cells are seen in lesions infected with varicella-zoster virus (chicken pox/shingles) and cytomegalovirus.

Chancroid

Isolation of Hemophilus ducreyi from a genital lesion or lymph node provides a definite diagnosis of chancroid. However, it is difficult to culture the organism. Gram stain of a lymph node aspirate is possible and may be helpful in making the diagnosis of chancroid.

Preparation of Slide

STEP 1. Apply a drop of aspirate to a glass slide, spread it over a large area with a swab or tooth pick, and allow to air-dry.

STEP 2. Heat-fix; after cooling, Gram stain the slide.

Interpretation

Positive: Tiny, chaining Gram-negative coccobacilli (rod-like), the so-called "school of fish," seen using the oil immersion (100X) objective.

Caution: Gram stain of lesion is generally not useful due to the frequent polymicrobial nature of these lesions. However, where the disease is prevalent and the clinician is experienced in examining Gram-stained smears, this test can be helpful.

Granuloma Inguinale (Donovanosis)

A touch prep of a lesion biopsy or tissue smear stained with Giemsa or Wright stain may reveal infection with C. Granulomatis.

Preparation of Slide

STEP 1. Apply a drop of aspirate to a glass slide and allow to air-dry.

STEP 2. Heat-fix; after cooling, Giemsa or Wright's stain the slide.

Interpretation

Positive: Large mononuclear cells with characteristic Donovan bodies seen under oil immersion (100X).

Molluscum Contagiosum

Express the core ("pearl") of a lesion on to a microscope slide, Wright stain the specimen and examine it microscopically (brightfield) for the classic basophilic intracytoplasmic inclusions, the so-called "molluscum bodies."

MICROSCOPY FOR PARASITES

Lice

Microscopic examination of a hair shaft will reveal nits of Phthirus pubis. Adult lice can also be captured and examined microscopically.

Preparation of Slide

Attach adult lice to piece of Scotch tape and affix to slide. Scan slide at low power (10X) to confirm diagnosis.

Scabies

To confirm a clinical diagnosis of scabies, Sarcoptes scabiei and/or its eggs and fecal pellets can be demonstrated microscopically.

Specimen Collection

STEP 1. Locate recently-developed, unexcoriated papules or burrows. Place a small drop of mineral oil on the site.

- STEP 2.** Using a sterile scalpel, scrape the lesions six or seven times to remove the tops of papules or burrows.
- STEP 3.** Transfer oil and scalpel material to a microscopic slide and cover with a coverslip.
- STEP 4.** Examine under low (10X) power.

Interpretation

Positive: Identification of the adult female mite (400 micrometers long), large, oval-shaped eggs, and/or fecal pellets, which may be more numerous than mites or eggs.

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- World Health Organization (1984). "Simplified approaches for sexually transmitted disease (STD) control at the primary health care level." Working Group Report, WHO/VDJ/85.437, Geneva

SECTION TWO:

ADDITIONAL PROCEDURES

DARKFIELD MICROSCOPY: DETECTION AND IDENTIFICATION OF TREPONEMA PALLIDUM¹:

Introduction

A diagnosis of syphilis is confirmed by using darkfield microscopy to demonstrate Treponema pallidum in material from suspected lesions or regional lymph nodes. A positive darkfield result constitutes an almost certain diagnosis of primary, secondary, early congenital, or infectious relapse syphilis. In primary syphilis, it may be possible to identify the etiologic agent and to diagnose the disease before measurable antibodies appear. Every genital lesion should be considered syphilitic until subjected to a darkfield examination and proven otherwise. Other lesions of the skin or mucous membranes should also be examined if there is suspicion of syphilis. Proper equipment, adequately trained personnel and perseverance are required to demonstrate the presence of Treponema pallidum in lesion material by darkfield microscopy.

Equipment, Glassware and Supplies Needed for Darkfield Microscopy

Darkfield Microscope Assembly

- Microscope stand with coarse and fine adjustment knobs and a revolving nosepiece for three objectives
- Body: an inclined monocular or binocular type
- Stage: a plain stage with an attachable ungraduated mechanical slide carrier
- Substage: a rack-and-pinion focusing substage for holding a darkfield condenser
- Objectives: They should be parfocal (i.e., when objectives are changed the focus is retained).

10X - low power²

¹ Abstracted from Manual of Tests for Syphilis, HEW, Public Health Service Publication No. 411, January 1969; and from "Darkfield Microscopy Procedure for Identification of Treponema Pallidum," Ernest T. Creighton, HEW, Laboratory Training and Consultation Division, September 1978.

² The low-power objective is used only to focus on the specimen and to focus and center the condenser; it is not to be used to search the specimen.

40X-45X - high dry power³

90X-100X - oil immersion⁴

(Note: For darkfield use, the oil immersion objective must be fitted with a funnel stop or equipped with a built-in iris diaphragm in order to lower the numerical aperture of the objective below that of the condenser.)

- Ocular(s): 10X
- Condenser: Darkfield immersion condenser, either a single- or double-reflecting type
- Illuminator: The illuminator should be **built into the base of the microscope**; it should not be attached to the darkfield condenser itself, because enough heat may be generated by this type of unit to cause complete loss of a critical identifying criterion -- the characteristic motility of the organism being observed. The built-in base illuminator should consist of a 6.0- to 6.5-volt, **high-intensity** lamp, or equivalent, with a variable transformer for regulating light intensity. If a separate external illuminator is used for the microscope, it should be equipped with an iris diaphragm and a 100-watt lamp, which in turn would require the microscope to have a flat-surface type of mirror for reflecting the light into the darkfield condenser.

Materials: 2 microscope slides (correct slide thickness specified on microscope condenser)
Coverslips, No. 1 (22x22 mm square)
Gloves, rubber or vinyl
Speculum; bivalve
Sterile scalpel blade
Applicator sticks
Gauze, 2x2 inch squares
60-90% ethyl or isopropyl alcohol
Lens paper
Lens cleaner
Petri dish (moist chamber)
Normal saline
Syringe, 1- or 2-ml.
Sterile needles: 18-20 gauge
Microscope adjusted for darkfield
Ocular (10X)
Objectives: Low power (10X), high dry power (40X), oil immersion power (100X) fitted with a funnel stop or built-in iris diaphragm
Condenser: Darkfield immersion or Darkfield (spider) stop
Illuminator, in-base

³ The high-dry objective is used to search the specimen.

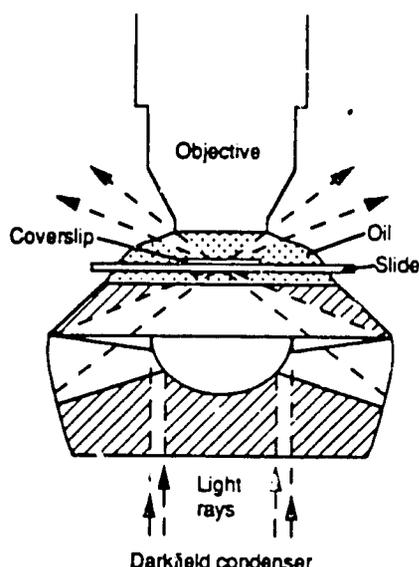
⁴ The oil immersion objective is used for final identification of organisms at higher magnification.

Adjustment of the Microscope

Principles of Darkfield Microscopy

The standard brightfield microscope can be equipped for darkfield examination by replacing the brightfield or Abbe condenser with a darkfield condenser or darkfield (spider) stop.

Darkfield illumination is accomplished by blocking out the central rays of light with an opaque stop in the darkfield condenser and reflecting peripheral rays from the side to the upper surface of the microscope slide (see below). The only direct rays of light entering the objective are those reflected from the surface of an object in the field.



When a fluid, containing particles, such as bacteria or treponemes, is placed on a slide, the oblique rays are reflected from the surfaces upward into the barrel of the microscope. As a result, the particles appear brightly illuminated against a black background, hence the term "darkfield."

A number of alignments are required before the microscope is ready for use. These should be done before collecting the specimens.

A. Microscope with built-in base light source

- STEP 1.** Place a blank glass slide on the stage and raise the substage containing the darkfield condenser to its maximum height. The top of the darkfield condenser should be just slightly below the level of the stage, but as close to the glass slide as possible without pushing it up. Adjust the condenser height by rotating the top of the condenser head clockwise to lower it and counter-clockwise to raise it.

- STEP 2. Turn on the variable transformer to produce the maximum light intensity.
- STEP 3. Lower the substage slightly and place 2-3 drops of immersion oil on the top of the condenser.
- Note: To complete and verify the microscope adjustment before examination of client material, prepare a suspension of gingival scrapings, which contain T. denticola, formerly T. microdentium, in a drop of saline on a slide and mount with a coverslip.
- STEP 4. Place slide on the stage and center specimen over the condenser with the mechanical slide carrier.
- STEP 5. Slowly raise the substage until there is an oil contact between the top of the condenser and the bottom of the slide. (Oil should completely cover the top of the condenser; care should be taken to avoid trapping air bubbles in the oil since these may obscure the specimen.) Do not place oil on top of the coverslip at this time.
- STEP 6. Rotate the objective revolving nosepiece to center the low power (10X) objective over the specimen.
- STEP 7. Bring specimen in focus by using the coarse adjustment knob.
- STEP 8. Center the light in the field by rotating the two centering screws located at the base of the condenser.
- STEP 9. Focus the darkfield condenser by raising or lowering the substage until the smallest diameter of the circular area of intense light is observed.
- STEP 10. Recheck the centering of the light and adjust if necessary.
- STEP 11. Rotate the objective nosepiece and center the high dry (40X) objective over the specimen.
- STEP 12. Bring the specimen in focus by using the fine adjustment knob only.
- STEP 13. Open the iris diaphragm on the light until the entire field is illuminated.
- B. Microscope with built-in light source and darkfield (spider) stop (e.g., Olympus CHT microscope)**
- STEP 1. Insert the darkfield stop (also called spider stop) by removing the filter holder located in the bottom of the condenser.
- STEP 2. To remove the filter, grasp the plastic ring at the bottom of the condenser and pull gently. **Caution:** there is a glass blue filter sitting in the filter holder.

- STEP 3.** Replace the filter with the spider stop and insert the holder back into the condenser. The filter holder should snap in place.
- STEP 4.** In order to achieve proper darkfield illumination, focus the condenser up and down until the background is at its darkest. With the 40X objective, this is easily achieved.
- STEP 5.** With the 100X objective, adjust the iris diaphragm located near the lower portion of the objective until the background is at its darkest in addition to that achieved by adjusting the condenser (STEP 4).
- STEP 6.** If you do not see your specimen, make certain that the condenser diaphragm knob is in its full open position (slide all the way to the left).

You are now ready to collect the specimens from the client's ulcers.

Specimen Collection

Ideally, the darkfield examination should be accomplished immediately, either by bringing the client to the microscope or the microscope to the client. Any appreciable delay in examination of a specimen may result in questionable findings because of reduced or complete loss of motility of the treponemes.

The objective in collecting a specimen for darkfield examination is to obtain serous fluid that is rich in T. pallidum and as free as possible of red blood cells and tissue debris which may obscure the treponemes. Thorough cleansing of the lesion is required to remove tissue debris and superficial spirochetal flora, such as the larger T. refringens (formerly Borrelia refringens) and the smaller indigenous treponemes (e.g., Treponema genitalis).

Remove any scab or crust covering the lesion. Cleanse the lesion with a gauze pad wet with tap water or physiological saline. Do not use antiseptics or soap because of their potential antitreponemal effects. Dry the area; abrade the lesion with a dry gauze pad to provoke slight bleeding and exudation of tissue fluid. As oozing occurs, wipe away the first few drops containing red blood cells, and await the appearance of relatively clear serous exudate. It is sometimes necessary to apply pressure at the base of the lesion to promote the appearance of tissue fluid. It is desirable to obtain the specimen from the depths of the lesion rather than from its surface because of the greater likelihood of finding motile treponemes. For direct examination, apply clean coverslips or slides to the oozing lesion. Flatten the coverslip evenly on the slide with the blunt end of an applicator stick to remove air bubbles, and examine immediately. If the lesion is readily oozing fluid, more than one specimen should be taken at this time, because it may be necessary to examine several slides before finding T. pallidum. To prevent drying, the additional slides with specimens should be kept in a moist chamber such as a large plastic Petri dish containing a moistened paper towel.

Note: The preparation should not have a large volume of fluid, since this causes rapid liquid flow across the field, nor should the preparation be so thin that drying becomes evident before an adequate examination can be made.

Lesions of early syphilis which are not manifest, but are suspected, necessitate special comment and management. The collection of material that is satisfactory for darkfield examination from lesions of the cervix and vaginal vault presents special problems. With visualization by a bivalve speculum, remove all cervical or vaginal discharge of an interfering nature. Cleanse the lesion with physiological saline and then dry and abrade it by rubbing with gauze sponges held by a Kelly clamp. As serous exudate appears, obtain material with a sterile bacteriological loop.

Lesions of the skin, even in the fading stage, merit examination. Material may be obtained by making a superficial abrasion of the lesion with a scalpel, needle tip, or mechanical abrader, or by injecting a drop or two of sterile saline in the base of the lesion and aspirating the fluid with a small-gauge needle and syringe. Mucous membrane lesions (patches) usually present little problem except in the mouth where Treponema denticola⁵ as well as other spiral organisms are frequently a part of the indigenous flora. Material may be collected from oral cavity lesions if care is taken in cleansing the lesion prior to collecting the specimen. **Results with specimens from oral sites must be interpreted cautiously.** When specimens are collected from lesions at or near the gingival margin, identification may not be possible because T. denticola, virtually indistinguishable from T. pallidum, are normally found in this area.

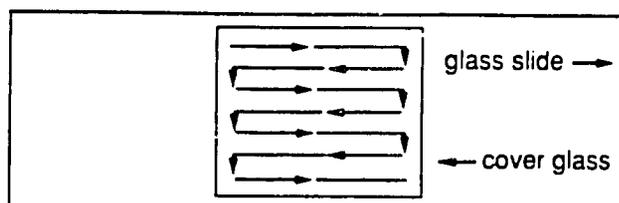
If local therapy has been applied to a syphilitic lesion, it may not be possible to demonstrate motile T. pallidum, even if several specimens are examined. In this instance, an aspirated sample from an enlarged regional lymph node may be used for diagnosis. Sterilize the skin over the node by swabbing it with iodine and alcohol or some other suitable agent. Rinse a sterile, 20-gauge needle and 2-ml syringe with sterile physiological saline and allow about 0.2 ml or less of saline to remain in the syringe. Hold the node firmly and insert the needle well into the node. The ability to manipulate the node freely with the needle tip is a good indication that its capsule has been pierced. Inject the sterile physiological saline into the node and macerate the tissue by gently manipulating the needle in various directions; then aspirate as much fluid as possible. Discharge the aspirated material on slides for immediate examination.

Microscopic Examination of the Specimen for T. pallidum

- STEP 1. Place slide on the microscope stage of the previously-adjusted darkfield microscope. Repeat STEPS 2 through 12 (Section 2.A) or STEPS 4 through 6 (Section 2.B) since minor adjustments may be required.

⁵ Formerly Treponema microdentium

- STEP 2.** Search the entire specimen **methodically** with the high dry objective for spiral organisms having the morphology and motility characteristics of T. pallidum. Make a careful, systematic and exhaustive search before making a negative report. A typical systematic scheme for adequately searching the specimen is shown in the figure below.



- STEP 3.** A good specimen is indicated by the presence of movement of the bacterial elements in the specimen. If no movement is present, the sample is too dry and inappropriate for evaluation.
- STEP 4.** If a suspected organism is observed, center it in the field with the mechanical stage for subsequent examination with the oil immersion objective.
- STEP 5.** Rotate the objective nosepiece halfway so that a small drop of immersion oil can be placed on the cover glass.
- Note:** If too much oil is placed on the coverslip or if the microscope is not parfocal, it may not be possible to return to the use of the high dry objective.
- STEP 6.** Continue rotation of the nosepiece until the oil immersion objective is in place over the specimen and in contact with the oil on the coverslip.
- STEP 7.** Examine the organism carefully for identification; focus with the fine adjustment knob only.
- STEP 8.** If organisms are found that have the characteristic morphology and motility of T. pallidum, make a positive report.
- STEP 9.** After examining a slide, discard it into a container of 60-90% alcohol or other suitable bactericidal solution.
- STEP 10.** At the end of the working day, remove the immersion oil from the stage, darkfield condenser and the oil immersion objective of the microscope. Use only lens paper and lens cleaner to clean the oil immersion objective in order to avoid scratching the lens. Keep the microscope free of oil and dust and in good working order at all times.

Differentiation of T. pallidum from Other Organisms and Objects

1. Characteristics of T. pallidum:

- Delicate spirilliform (corkscrew-shaped) organism with an average of 8-14 regular, rigid, tightly wound, deep spirals
- Very thin and usually only 6-14 micrometers in length
- Coiled appearance retained despite active motility
- Slow rotation about the long axis (like a corkscrew) with soft bending, twisting, or undulation from side to side, giving a shimmering graceful effect
- Little or no waving or flattening

2. Characteristics of T. refringens-like organisms:

- Variable number of loosely wound spirals (3 to 20)
- Thick and coarse appearance
- Variable length of 2-30 micrometers
- Rapid movement (translation) across or out of the field, with a writhing motion

In summary, T. pallidum is a thin, tightly wound, rigid, spiral organism exhibiting little flexibility and does not move rapidly from place to place. Any coarsely wound spiral organism exhibiting great flexibility and rapidly moving from place to place is **not** T. pallidum.

Caution should be used in interpreting results on slides containing numerous artifacts or refractile objects. The untrained and the unwary may be deceived by miscellaneous pieces of cellular debris, cotton strands, flagella, cilia, and fine scratches on glass slides. These and forms similar to treponemes made of spiral fibrin filaments can, with Brownian movement, be quite deceptive.

Interpretation of Findings

Every genital lesion should be considered syphilitic until proven otherwise. **Failure to find the organism does not exclude a diagnosis of syphilis.** Negative results of darkfield examination may mean one or more of the following:

- A sufficient number of organisms were not present to be detected.
- The client received antitreponemal drugs locally or systemically.
- The lesion is "fading" or approaching natural resolution or disappearance.

- The lesion is one of late syphilis.
- The lesion is not syphilitic.

When the darkfield examination is negative in clients suspected of having primary syphilis, repeated examinations (on as many as three consecutive days) or aspiration of enlarged regional lymph nodes may be necessary.

Sources of Error

A summary of the more frequent sources of error in the darkfield examination may be helpful as a checklist:

1. Preparation error

- Too many refractile elements (red blood cells, air bubbles, tissue fragments, etc.)
- Dirty or defective glassware (fine scratches on slides and coverslips)
- Slides too thick or too thin (required slide thickness is engraved on the top of many condensers)
- Coverslips too thick (usually Size No. 1 coverslip is satisfactory)
- Excessive fluid between glass slide and coverslip with too rapid flow of liquid across field of vision and too much depth to scan.
- Too little fluid between glass slide and coverslip with evaporation effects accentuated.

2. Microscopy error

- No oil placed between condenser and the slide, as well as between oil immersion objective and coverslip
- Concave side of the mirror used
- Condenser not properly centered
- Condenser not properly focused, too high or too low
- Numerical aperture of objective too high
- High numerical aperture of oil immersion objective not compensated for with funnel stop or iris diaphragm
- Oil on 10X or 40X objectives, giving a hazy picture without sharp definition

- Inadequate light source
 - Microscope focused on coverslip instead of specimen
 - Inadequate or unmethodical search of the specimen
3. Error in differentiating T. pallidum from other organisms and objects:
- Unfamiliarity with the morphology and motility characteristics of T. pallidum
 - Unfamiliarity with characteristics of nonspecific spiral organisms, tissue debris, fibrin strands and other extraneous objects
 - Mistaking the effects of Brownian movement for motility
 - Occasional erratic movement of T. pallidum, or no movement at all, especially if too long an interval elapses between making the slide and examining it.

GLOSSARY

1. Monocular microscope - a microscope designed to be used with a single ocular (eyepiece).
2. Binocular microscope - a microscope with two oculars designed to furnish an identical image to each eye.
3. Substage - a fork or ring mount located directly below the mechanical stage; it contains the darkfield condenser and is activated by rack-and-pinion.
4. Stage - the platform of the microscope with attachable mechanical slide carrier for orienting the slide to be examined.
5. Iris diaphragm - a set of adjustable, multi-leaf overlapping plates which can be adjusted to reduce the size of a beam of light.
6. Coarse adjustment knob control - a control knob used to bring the microscope into focus with low-power objectives.
7. Fine adjustment control - a control knob used to bring the microscope into fine adjustment with high-power objectives.
8. Revolving nosepiece - that part of the microscope which contains places for three or more objectives.
9. Parfocal - the retaining in focus of the subject when objectives of different magnification are interchanged.
10. Objective - the lens system near the object which forms the primary image.
11. Ocular (eyepiece) - the combination of lenses of a microscope which is nearest to the eye and serves to magnify the image made by the objective.
12. Darkfield condenser - a type of condenser used especially for darkfield illumination.
13. Darkfield (spider) stop - a small device used in place of a darkfield condenser in some types of microscopes.
14. Funnel stop - a part placed in an oil immersion objective to lower the numerical aperture of the objective below that of the condenser.
15. Numerical aperture (N.A.) - a numerical value by which both dry and immersion objectives can be directly compared for resolving power.
16. Resolution - the ability of a lens to separate fine details.
17. Wavelength - distance from the top of one coil to the top of the next coil.

18. Translation - the forward and backward movements of an object.
19. Brownian movement - the dancing motion of minute particles suspended in a liquid.
20. Micrometer⁶ - a unit of measurement used in microbiology. It is equivalent to 1/1000 mm (10^{-3} mm) or 1/25,400 inch.

⁶ formerly known as micron (μ)

RAPID PLASMA REAGIN TEST (RPR)

Use: Rapid nontreponemal serologic test for syphilis

Materials: RPR Card test kit (commercially available)
Known positive and negative sera for controls or control cards (commercially available)
Card test rotator with humidifying cover
Distilled water
1 ml serologic pipets
Plasma or serum (5 ml tube is adequate)

Notes

1. All materials in the kit must be stored in a refrigerator (2-8°C) except the RPR test cards (store at room temperature in a dry, protected area).
2. Store control sera in a freezer (-20°C).
3. To assure quality results several quality control procedures should be performed:
 - Periodically - Always test accuracy of needle before initial use
 - Daily
 - Check temperature of testing area (room). (Acceptable range is 23-28° C.)
 - Warm all materials and specimens to room temperature (23-28°C) before using.
 - Check speed of rotator. (Acceptable range is 98-102 rpm.)
 - Check humidifying chamber for adequate moisture. Moisten the sponge.
 - Test antigen suspension on control cards for proper reactivity.

Test Procedure

To perform the test **consult the instructions contained in the kit**. Total time to perform the test is approximately 10-15 minutes and the results are read directly from the test cards using a bright light (high intensity incandescent) or daylight. **Fluorescent light source may cause interpretation errors.**

Interpretation

Reactive: Characteristic clumping (includes minimal to moderate reactives)

Nonreactive: No clumping or slight roughness

SECTION THREE:

REAGENT PREPARATION

Preparation of Normal Saline

STEP 1. Dissolve 8.5 gm sodium chloride (NaCl) in 900 ml water (preferably distilled, otherwise use boiled and filtered).

STEP 2. Add sufficient water to make up the volume to 1 liter.

Preparation of 10% KOH

STEP 1. Dissolve 10.0 gm potassium hydroxide (KOH) in 9 ml water (preferably distilled, otherwise use boiled and filtered).

STEP 2. Add sufficient water to make up the volume to 100 ml (0.1 liter).

Caution: Be careful with this solution as it is very caustic if spilled on clothes or skin. Flush immediately with water if spill occurs.

Preparation of Gram Stain

STEP 1. Crystal violet, modified Hucker

- a. Solution A
Crystal violet (certified) 2 gm
Ethyl alcohol, 95% 20 ml
- b. Solution B
Ammonium oxalate 1 gm
Distilled water 80 ml

STEP 2. Gram's iodine

- Iodine 1 gm
Potassium iodide 2 gm
Distilled water 300 ml

- STEP 3.** Acetone-Alcohol decolorizer (1:1 mixture of acetone-alcohol)
- | | |
|--------------------|-------|
| Ethyl alcohol, 95% | 50 ml |
| Acetone | 50 ml |
- STEP 4.** Safranin counterstain
- a. Stock solution
- | | |
|------------------------|----------|
| Safranin O (certified) | 2.5 gm |
| Ethyl alcohol, 95% | 100.0 ml |
- b. Working solution
- | | |
|-----------------|-------|
| Stock solution | 10 ml |
| Distilled water | 90 ml |

Preparation of Methylene Blue Stain (0.3%)

- STEP 1.** Dissolve 450 mg methylene blue in 30 ml ethanol (99.9%).
- STEP 2.** Dissolve 10 mg KOH in 100 ml water. (Distilled water is preferred if available, but clean filtered, boiled water may be used.)
- STEP 3.** Mix the two solutions and sterilize, if possible, by filtration (0.22 micrometers).
- STEP 4.** The solution must be stored in darkness at 4°C.

Preparation of Wright Stain

- STEP 1.** Prepare stock Wright stain as follows:

Wright stain powder (available commercially)	1 g
Glycerol	50 ml
Methanol (100%)	50 ml

Mix the alcohol and glycerol together before adding the stain powder. Store at room temperature.

- STEP 2.** Prepare working solution immediately before use as follows:

Stock stain solution	4 ml
Acetone	3 ml
Phosphate buffer (1/15 M, pH 6.5)	2 ml
Distilled water	31 ml

Mix together in a Coplin jar. The solution may be used for two staining procedures if they are performed one after the other.

- STEP 3. Prepare blood or tissue films by spreading material thinly over slide using a second slide. Fix immediately in absolute methanol for two to three minutes.
- STEP 4. Allow the fixed slides to air dry.
- STEP 5. Immerse the slides in a Coplin jar containing the working solution for five minutes.
- STEP 6. Wash gently in distilled water and air dry.
- STEP 7. Examine for parasite forms under several different magnifications. Structures appear blue, purplish and red.

REFERENCE:

Clark, ed. (1981). Staining procedures, ed. 4, Williams and Wilkins, Baltimore.

Preparation of Giemsa Stain

Giemsa stain is prepared by dissolving 0.5g of powder in 33 ml of glycerol at 55°-60° C for 1.5-2 hours. To this is added 33 ml of absolute methanol, acetone free. The solution is mixed thoroughly and allowed to sediment and then is stored at room temperature as stock. Dilutions of the stock stain are made with neutral distilled water or buffered water in a ratio of 1 part of stock Giemsa solution to 40 or 50 parts of diluent.

REFERENCE:

Schachter (1980), In Lennette et al., eds: Manual of Clinical Microbiology, ed. 3. American Society for Microbiology, Washington, D.C.

APPENDIX B
BASIC FACTS ABOUT GTIs

CONTENTS

Section One: Microorganisms causing Genital Discharge

Candidiasis
Bacterial Vaginosis
Trichomoniasis
Gonorrhea
Chlamydia

Section Two: Microorganisms causing Genital Ulcers

Syphilis
Chancroid
Lymphogranuloma Venereum
Herpes
Granuloma Inguinale

Section Three: Microorganisms causing Genital Skin Conditions

Condyloma Acuminata
Molluscum Contagiosum
Pediculosis Pubis
Scabies

SECTION ONE:

MICROORGANISMS CAUSING GENTAL DISCHARGE

VAGINITIS

CANDIDIASIS (Monilia, thrush, candidosis)

Microbiology

Yeasts are the only fungi of importance isolated from the vagina and may be found in healthy women as well as those with vaginitis. Candida albicans is the most common species found, but other Candida or Torulopsis sp. also may be present.

Clinical Features

Many women, especially during pregnancy, have no symptoms at all. When symptoms do occur they are:

- Discomfort with sexual intercourse
- Intense vulval itchiness or burning on urination
- Vaginal discharge
- White discharge with curds like milk or cottage cheese
- Vaginal wall red and inflamed
- Vulvar edema

In men, symptoms include:

- Itchiness of the glans penis and foreskin
- White discharge under the foreskin if uncircumcised
- Edema (swelling) of the foreskin
- Phimosis (tight foreskin) and/or cracks in the foreskin
- Urethritis with slight urethral discharge (occasionally)

Remember: Candidiasis occurs more frequently in:

- Persons with diabetes
- Women on antibiotics, especially tetracycline and ampicillin
- Women using oral contraceptive pills (OCs) or injectables
- Pregnant women

Diagnosis (Flowchart 1, Chapter 4)

1. By clinical examination of the vagina.
2. Confirmation is made by placing a sample of vaginal secretions on a slide and adding a drop of 10% potassium hydroxide (KOH). KOH dissolves other cellular material and debris, and allows the yeast forms (buds and hyphae) to be seen easily during microscopic examination. (See Appendix A: Saline and KOH Wet Mounts, Vaginal pH.)

Incubation Period

Variable, 2-5 days

Mode of Transmission

- By contact with secretions from the vagina, penis, mouth and especially feces from patients or carriers
- From mother to infant during childbirth
- Usually is not sexually transmitted

Contagious Period

Presumably for duration of symptoms and discharge and for up to one week after completing treatment

Prevention

1. Avoid sexual intercourse during treatment.
2. To minimize the risk of self-infection, women should not wear wet undergarments (minimizes risk of fecal contamination of the vulva and vagina).
3. Detect and treat candida vaginitis during the third trimester of pregnancy to avoid neonatal infection (thrush).

BACTERIAL VAGINOSIS (BV)

Microbiology

Bacterial vaginosis (formerly nonspecific vaginitis) is so named because no single bacterial agent is the cause and true inflammation does not occur. BV results when the normal vaginal bacterial flora, which includes a predominance of lactobacilli (Gram-positive rods), changes primarily to Gardnerella Vaginalis (Gram-negative organisms) and anaerobes such as mobiluncus species. The latter may be a more specific bacterial indicator of the presence of BV than G. vaginalis.

Clinical Features

1. Patients complain of a vaginal discharge with a "fishy" odor.
2. The discharge is grayish in color, sticky and adheres to the vaginal epithelium.

Diagnosis (Flowchart 1, Chapter 4)

Several criteria are used:

- Vaginal pH greater than 4.5
- Unpleasant fishy (amine-like) odor when 10% KOH added to vaginal secretions ("Whiff" test)
- Wet mount of vaginal secretions shows epithelial cells covered with small bacteria ("clue" cells)
- Gram stain for examination of the bacterial flora revealing predominance of Gram-negative organisms versus lactobacilli (Gram-positive)

See Appendix A: Saline and KOH Wet Mounts, Vaginal pH for details on performing these tests.

Incubation Period

Unknown

Mode of Transmission

Because BV results when there is a disturbance in the normal vaginal bacterial flora, predisposing factors are antibiotic treatment, systemic disease (such as diabetes), pregnancy and douching. The importance of sexual transmission in BV is not known.

Contagious Period

Presumably for duration of symptoms and presence of discharge

Prevention

Unknown

TRICHOMONIASIS

Microbiology

Trichomonas vaginalis is a motile, flagellated parasite (protozoa) which causes infection in the vagina and cervix of women and occasionally the prostrate and urethra of men.

Clinical Features

Women may have no symptoms, or:

- They may complain of a vaginal discharge and itchiness of the vagina and vulva.
- The cervix may be eroded and the vaginal epithelium inflamed.
- The discharge usually is frothy, has a green-yellow color and may be foul-smelling.

Men usually have no symptoms, but may have a demonstrable whitish, watery urethral discharge.

Diagnosis (Flowchart 1, Chapter 4)

Diagnosis is made following microscopic examination of a wet mount preparation of vaginal secretions. A drop of secretion is placed on a slide, then a drop of saline is added and the slide quickly examined for motile trichomonads. (See Appendix A: Saline and KOH Wet Mounts, Vaginal pH.)

Incubation Period

Four to 20 days, average 7 days

Mode of Transmission

By contact with vaginal and urethral discharge from infected persons during sexual intercourse and, potentially, by contact with contaminated articles

Contagious Period

For duration of symptoms and discharge (if present) and up to one week after completing treatment

Prevention

1. Educate clients as to the symptoms and mode of transmission by sexual contact with infected partners or carriers.
2. Encourage individuals with symptoms to seek immediate treatment and to avoid sexual intercourse during treatment.
3. Individuals with multiple sex partners should use condoms and spermicides to minimize the risk of GTIs.

CERVICITIS AND URETHRITIS

GONORRHEA (Clap, Strain, Dose, GU)

Microbiology

This disease is caused by a bacteria called Neisseria gonorrhoea, a Gram-positive intracellular diplococci.

Clinical Features - Women

Uncomplicated Infection (Early)

- Purulent vaginal discharge
- Pain on passing urine - due to inflammation of the urethra
- Sticky mucopurulent endocervical discharge evident on examination of cervix

Remember: About 80% of women will have no symptoms.

Complicated Infection

In about 20% of infected women there is upward progression of the disease to the uterus (endometritis) and fallopian tubes (salpingitis) during the first, second or subsequent menstrual period. If untreated, the infection may cause the following complications:

- Inflammation of the pelvic organs (PID)
- Ectopic pregnancy (pregnancy in the fallopian tubes due to partial blockage of tubes)
- Infertility (due to bilateral blockage of tubes)
- Bartholin's abscess (vulvar abscess)

- Infection of the eyes (rarely in adults) due to self-contamination

Clinical Features - Men

Uncomplicated Infection

- Dysuria (painful urination)
- Purulent urethral discharge

Complicated Infection

The untreated patient may develop the following complications:

- Infection of the epididymis and testes
- Urethral abscess and/or stricture
- Infertility due to bilateral obstruction of the epididymis and/or permanent damage to the testes
- Rarely infection of the eyes in adults due to self- contamination

Diagnosis (Flowcharts 2 and 3, Chapters 4 and 5)

Presumptive diagnosis is based on microscopic identification of typical Gram-negative intracellular diplococci (GNIDs) on smear of urethral or endocervical exudate (see Appendix A: Gram Stain).

In men, typical smears are 95% specific. Under ideal circumstances, the specificity of cervical Gram stain in women is 97%; however, sensitivity at best is 40-60% (Stamm et al, 1988).

Incubation Period

2-7 days (average 3 days)

Mode of Transmission

Sexual contact with discharges from the mucous membranes of infected persons. Gonococci can only infect cells lining mucous membranes having columnar or transitional epithelium; they do not infect the squamous (flat) epithelium such as that lining the vagina.

Contagious Period

May extend for months if untreated, especially in asymptomatic individuals. Infected individuals should avoid sexual intercourse during treatment and/or until symptoms (if present) are gone.

Prevention

1. Educate individuals as to the symptoms and mode of transmission by sexual contact with infected partners or carriers.
2. Encourage individuals with symptoms to seek immediate treatment and to avoid sexual intercourse during treatment.
3. Individuals with multiple sex partners should use a barrier contraceptive method (condoms) and spermicides to minimize the risk of GTIs.

CHLAMYDIA

Microbiology

The infectious agent is Chlamydia trachomatis, an obligate intracellular bacterium. Chlamydial organisms are responsible for causing a number of sexually transmitted GTIs, including:

- Nongonococcal urethritis (NGU)
- Nongonococcal cervicitis (NGC)
- Lymphogranuloma venereum (LGV)

Clinical Features - Women (Cervicitis/urethritis)

Uncomplicated Infection

- Mucopurulent endocervical and even vaginal discharge (yellow or mucoid)
- On examination normal cervix or "beefy" red cervix with bleeding of the columnar (round cell) epithelium spontaneously or when touched with a cotton-tipped swab ("swab" test)
- Dysuria (painful urination) and mild itching of the vulva and perineum; however, most women are without symptoms.

Complicated Infection

If untreated, chlamydia cervicitis/urethritis may cause the following complications:

- Symptomatic or asymptomatic endometritis, salpingitis and subsequent infertility.
- Ectopic pregnancy
- Ascending infection during pregnancy may cause postpartum infection (endometritis) in the mother and conjunctivitis or pneumonia in the neonate.

Clinical Features - Men (Nongonococcal urethritis [NGU])

Uncomplicated Infection

- Dysuria, itching and urethral discharge
- Urethral discharge may be demonstrated only by stripping (milking) the penis prior to the first urination in the morning.
- NGU usually causes less dysuria and less profuse urethral discharge than gonorrhea.

Complicated Infection

If untreated, men may develop the following complications:

- Infection of the epididymis or testes
- Urethral abscess and/or stricture
- Infertility due to blockage of the epididymis (if bilateral) and/or permanent damage to the testes

Diagnosis (Flowcharts 2 and 3, Chapters 4 and 5)

In both women and men, NGU or NGC will be due to chlamydia in about 30-50% of patients. Moreover, in women with gonorrheal cervicitis about 30-40% also will have chlamydia.

Presumptive diagnosis is based on microscopic findings from Gram-stained specimens (see Appendix A: Gram Stain) according to the following criteria:

Cervicitis: No Gram-negative intracellular diplococci (GNIDs) identified and ten or more PMNs per oil immersion field

Urethritis: Greater than or equal to 5 PMNs per oil immersion field and no intracellular GNIDs found

Incubation Period

7-14 days or longer

Mode of Transmission

Sexual contact with the vaginal or urethral exudate of infected individuals or carriers

Contagious Period

If untreated, perhaps indefinitely. Individuals are probably infectious during treatment and until symptoms (if present) remit.

Prevention

1. Educate individuals as to the symptoms and mode of transmission by sexual contact with infected partners or carriers.
2. Encourage individuals with symptoms to seek immediate treatment and to avoid sexual intercourse during treatment.
3. Individuals with multiple sex partners should use a barrier contraceptive method (condoms) and spermicides to minimize the risk of GTIs.

SECTION TWO:

MICROORGANISMS CAUSING GENITAL ULCERS

SYPHILIS

Microbiology

Syphilis is caused by a bacterium known as Treponema pallidum. This disease, if untreated, can affect all organs of the body. It occurs in two forms - early and late - and is characterized clinically by a primary (usually genital) lesion, a secondary rash involving skin and mucous membranes, a long period of latency (no evidence of infection) and late (tertiary) lesions of skin, bone, CNS, abdominal organs and the heart and great vessels. The primary and secondary stages are called "early" syphilis and the latent phase and tertiary stage, "late" syphilis.

Clinical Features

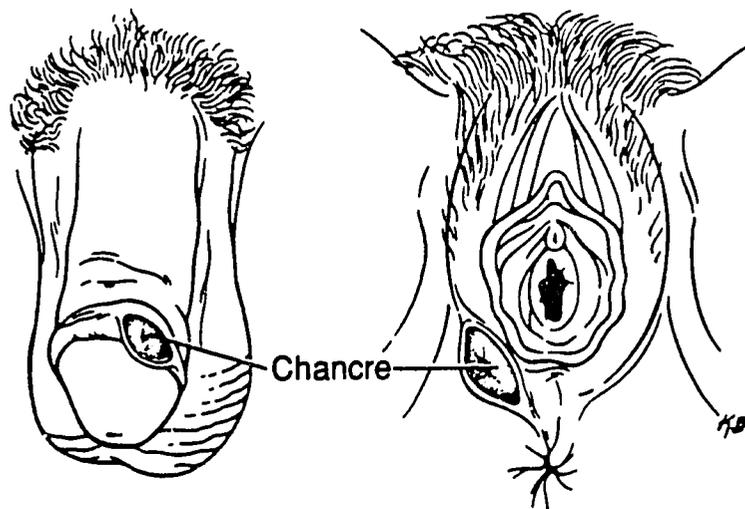
Primary Syphilis

About three weeks (10 - 90 days) after contact with an infected partner a solitary ulcer develops at the site of infection. This lesion is the "primary chancre," which presents in a variety of forms. The most distinctive, but not the most frequent form, characteristically presents as:

- a painless chancre (ulcer) with a raised border and a watery exudate, and
- enlarged lymph nodes that feel rubbery.

In men, the primary chancre typically is found anywhere on the penis. In women, it usually appears on the external genitalia (labia and perineum), vaginal opening, inside the vagina or on the cervix.

Syphilitic sore - Primary Chancre



Within two to six weeks, even without treatment, the primary chancre of syphilis usually heals and gradually disappears.

Secondary Syphilis

After two to four months untreated patients may develop secondary syphilis. The first sign of secondary syphilis may be a rash all over the body or selectively involve only the palms of hands and soles of feet. The rash may become papular with round, solid, raised lesions on skin. The rash typically appears in areas of moisture and friction, and may develop into flat warts (condylomata lata). Also, there may be whitish lines on the tongue and mucous membrane of the mouth called "snailtrack" ulcers, and generalized lymph node enlargement. Patchy hair loss of the head and body may occur as well. The secondary lesions of syphilis disappear spontaneously within weeks or by the end of one year.

Remember:

1. During the primary and secondary stages (known as early syphilis), the patient is infectious to his/her sexual partners.
2. Gloves should be worn when touching infective material (secretions and blood) of persons with syphilis because the skin lesions of primary and secondary syphilis may be highly infective.

Latent Syphilis

Following early syphilis, untreated patients enter a period of time when they remain infectious and relapses may occur (up to four years from the onset of primary syphilis). During this stage there are no symptoms or signs of syphilis but blood tests (serology) are positive and the patient is still infectious.

Late Syphilis (Tertiary)

From 10 to 25 years after early syphilis, approximately one-third of untreated patients develop late syphilis, characterized by:

- Lesions of the heart, great vessels and brain most frequently
- The appearance of granulomatous, noninfectious lesions (gummas) involving any tissue or organ

Diagnosis (Flowchart 4, Chapter 7)

- Diagnosis is made by visualization of the organism by darkfield examination (primary or secondary disease). (See Appendix A: Darkfield Microscopy for Syphilis.)
- Serologic testing is necessary only for equivocal cases and during the latent stage.

- The most commonly used serologic tests are the RPR (Rapid Plasma Reagin) and the VDRL (Venereal Disease Research Laboratory). These tests are quick and cheap to perform but can give a false positive result (i.e., the test is positive when the patient really is not infected). However, it is best to treat all patients who are positive. **Remember:** Both tests become positive about five weeks after the initial infection and may only become negative a long time after adequate treatment.

Incubation Period

Ten days to 10 weeks, usually about three weeks

Mode of Transmission

1. By direct contact with infectious, moist early lesions of skin and mucous membranes, body fluids and secretions (saliva, semen, blood, vaginal discharges) of infected persons during sexual contact; rarely by kissing or fondling children with congenital disease
2. Transmission can occur through blood transfusion if the donor has early primary or secondary syphilis.
3. Infection by indirect contact with contaminated articles is possible, but rarely occurs.
4. Fetal infection occurs through placental transfer.

Contagious Period

1. Some untreated cases may be communicable intermittently for two to four years after the initial infection.
2. Congenital transmission is most probable during early maternal syphilis but can occur throughout the latent period (2-4 years).
3. Effective antibiotic treatment usually ends infectivity within 24-48 hours but patients should avoid sexual contact during treatment.

Prevention

1. Educate patients concerning the clinical findings in early and late syphilis and the mode of transmission by sexual contact with infected partners during the early stage.
2. Encourage individuals with symptoms to seek immediate treatment and to avoid sexual intercourse during treatment.
3. Discourage individuals from having multiple sex partners; but if they do, to use a condom or spermicides to minimize the risk of infection.
4. Congenital syphilis only can be prevented by obtaining serology in early and late (third

trimester) pregnancy or at the time of delivery and treating the positives.

CHANCROID (Soft Chancre)

Microbiology

Chancroid is caused by infection with a bacteria known as Haemophilis ducreyi.

Clinical Features

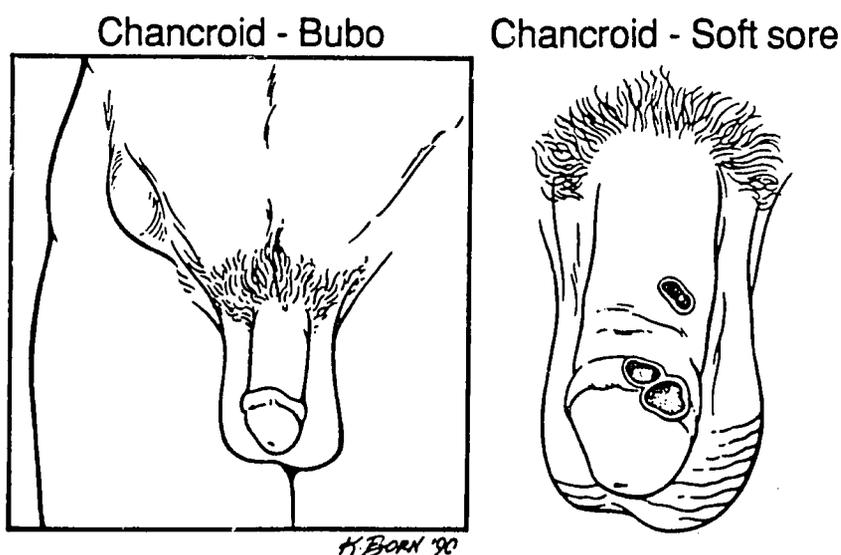
In many developing countries, chancroid is the leading cause of genital ulcers. Typically the ulcers are dirty and painful, unlike those of syphilis which are not painful.

In women, chancroid ulcers may be found anywhere on the external genitalia, near the entrance to the vagina, labia minora, clitoris, inside the vagina, on the cervix or around the vulva and anus. In men, the ulcers are found commonly on the edge of the glans penis, but may appear anywhere on the external genitalia.

A typical lesion begins as a tender papule with surrounding redness. This papule soon becomes pustular and evolves to form a painful, sharply outlined ulcer. The ulcer may be necrotic or surrounded by a reddish halo.

Patients with chancroid often (25-60%) develop enlarged lymph nodes called buboes.

Remember: Chancroid ulcers are painful, while the syphilitic ones usually are not.



Complications

Complications from chancroid infection include:

- Secondary infection and necrosis of the ulcers
- Rupture of the buboes with abscess formation and chronic draining fistula (openings)

Diagnosis (Flowchart 4, Chapter 7)

- A presumptive diagnosis is based on typical clinical presentation. However, this alone is often inaccurate because primary syphilis, herpes and lymphogranuloma venereum may be confused with chancroid.
- Confirmation depends on identification of *H. ducreyi* by direct smear of the ulcer or bubo aspirate. Gram stain preparations may show Gram-negative coccobacilli in chains ("school of fish"). (See Appendix A: Direct Smears.)

Incubation Period

From 3 to 5 days, up to 14 days

Contagious Period

As long as the infectious agent is present in the ulcer or buboes; usually until healed (i.e., several weeks)

Mode of Transmission

By direct sexual contact with fluid from the ulcers and pus from the buboes

Prevention

1. Educate individuals as to the symptoms and mode of transmission by sexual contact with infected partners or carriers.
2. Encourage individuals with symptoms to seek immediate treatment and to avoid sexual intercourse during treatment.
3. Individuals with multiple sex partners should use a barrier contraceptive method (condoms) and spermicides to minimize the risk of GTIs.

LYMPHOGRANULOMA VENEREUM (LGV)

Microbiology

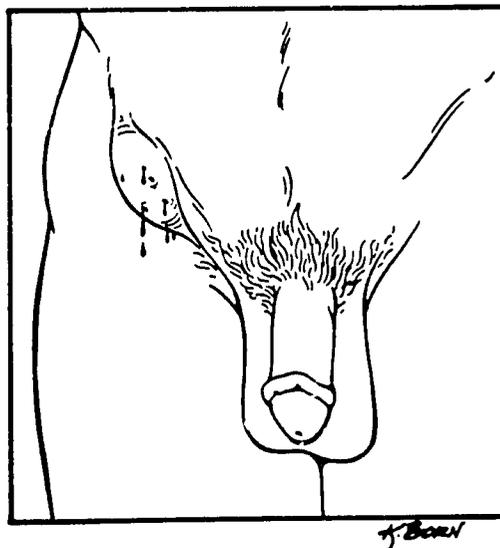
This infection affects mainly the lymphatic system and is caused by Chlamydia trachomatis, an obligate intracellular virus-like organism. The strains of C. trachomatis causing LGV are distinct from those causing nongonococcal urethritis (NGU) or cervicitis.

Clinical Features

1. In both sexes, the initial lesion is a small, painless erosion, papule or nodule on the penis or vulva, which frequently:
 - Goes unnoticed
 - Heals quickly (even if untreated)
2. Next, lymph node enlargement (bubo) occurs in the groin (men) or in the pelvic, rectal and rectovaginal nodes (women).
3. In the third phase of the illness, the buboes break down, forming many draining openings (fistula) and abscesses may develop.

Lymphogranuloma venereum (Bubo)

Tender, soft bubo
suppurates through
several fistula



4. If untreated or inadequately treated, the lymphatic system may be blocked and genital elephantiasis occurs.

Remember: LGV is the only C. trachomatis infection that causes systemic symptoms, such as fever, chills, headache, joint pains and anorexia. The course of the disease is long and the disability considerable.

Diagnosis (Flowchart 4, Chapter 7)

1. Clinical findings may not be very helpful.
2. The diagnosis is made by demonstration of inclusion bodies in PMNs of the bubo aspirate (see Appendix A: Direct Smears).

Incubation Period

Variable, with a range of 3 to 30 days for a primary lesion; if a bubo is the first manifestation, 10 to 30 days, to several months

Mode of Transmission

Direct contact with open lesions of infected persons, usually during sexual intercourse

Contagious Period

Variable, from weeks to years, during presence of active lesions

Prevention

1. Educate individuals as to the symptoms and mode of transmission by sexual contact with infected partners or carriers.
2. Encourage individuals with symptoms to seek immediate treatment and to avoid sexual intercourse during treatment.
3. Individuals with multiple sex partners should use a barrier contraceptive method (condoms) and spermicides to minimize the risk of GTIs.

HERPES

Microbiology

Genital herpes is usually caused by one of the two strains of the herpes simplex virus, type 2. HSV-2 infection occurs primarily in adults who are sexually active. HSV-1 usually causes oral herpes commonly known as cold sores or fever blisters.

Clinical Features - Women

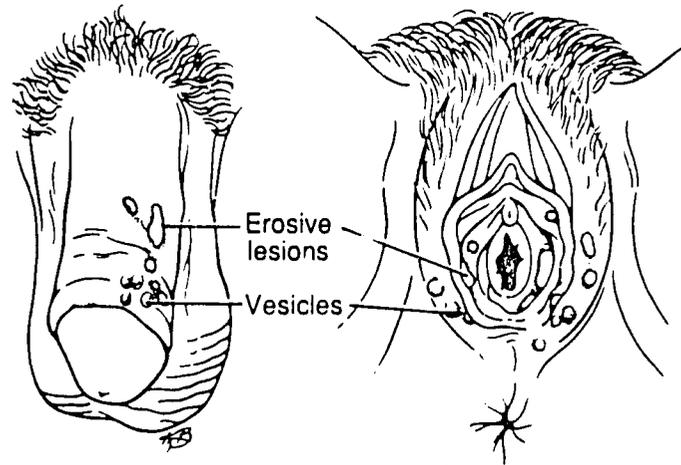
- During the first attack, single or multiple vesicles usually appear on the vulva, vagina or cervix. These vesicles quickly break down to form shallow ulcers which often are very painful. Extensive inflammation and swelling may occur and a profuse, watery vaginal discharge may be present.
- The first attack may be associated with fever, malaise, anorexia and tender bilateral groin nodes.
- The lesions may last from 2 to 4 weeks during the primary infection.

Clinical Features - Men

- The individual typically first develops itchiness at the site of infection, which may be the foreskin, the shaft of the penis or the glans penis. A small area of redness appears, which develops into small blisters. These usually break down and become painful, shallow ulcers.
- In the first attack, lesions are more extensive and cause severe pain.

In both sexes, recurrence commonly occurs (about 50% of patients). In recurrences, the lesions are less extensive and heal within 5 to 7 days. Recurrent infection is often preceded by prodromal symptoms of pain, burning, tingling or itching.

Genital Herpes



Complications

1. Vaginal delivery of pregnant women with active genital infections, particularly if primary, carries a high risk of infection to the fetus or newborn, causing disseminated visceral infection, encephalitis and death.
2. Genital (cervical) infection with HSV-2 in adult women may be a risk factor (i.e., in association with human papilloma virus [HPV] or other agent) in cancer of the cervix.

Diagnosis (Flowchart 4, Chapter 7)

When typical genital lesions are present or a pattern of recurrence occurs, herpes infection is likely. A presumptive diagnosis also is supported by the demonstration of multinucleated giant cells in a clinical specimen prepared using Wright-Giemsa stain (Tzanck smear, see Appendix A).

Incubation Period

Two to 12 days

Mode of Transmission

Sexual contact with infected individuals. Asymptomatic genital infections with viral shedding are common in recurrent diseases.

Contagious Period

Individuals with primary genital lesions are infective for about 7 to 12 days; with recurrent disease, for 4 days to 1 week.

Prevention

1. Individuals should be taught about the natural history of genital herpes infection and advised to abstain from sexual contact while lesions are present.
2. Transmission of herpes simplex virus can also occur during asymptomatic periods.
3. Condoms may offer some protection.
4. Women with genital herpes infection should have yearly Pap smears.
5. Pregnant women should inform their health care provider of a history of genital herpes infection in themselves or their sex partners.

GRANULOMA INGUINALE

Microbiology

This infection is caused by a bacterium known as Calymmatobacterium granulomatis. It is a sexually transmitted GTI of the skin and mucus membranes of the external genitalia, groin and anal region.

Clinical Features

Typically the patient develops lumps under the skin in the genital region. The lumps enlarge and eventually break down to become beefy red painless ulcers. Usually no lymph node enlargement (buboes) occurs. The lesions are more apt to be found on warm and moist surfaces, such as the folds between the scrotum and thighs or labia and vagina.

Complications

If neglected, the process may result in extensive destruction of genital organs and spread to other parts of the body. Occasionally, this infection is associated with squamous cell carcinoma of the penis.

Diagnosis (Flowchart 4, Chapter 7)

It is based on demonstrating intracytoplasmic Donovan bodies in Giemsa-stained smears of granulation tissue or of biopsy specimens. (See Appendix A: Direct Smears).

Incubation Period

Unknown; probably between 8-80 days.

Mode of Transmission

Presumably by direct contact with open lesions during sexual activity.

Contagious Period

Unknown, probably for the duration of open lesions on the skin and mucus membranes.

Prevention

1. Educate individuals as to the symptoms and mode of transmission by sexual contact with infected partners or carriers.
2. Encourage individuals with symptoms to seek immediate treatment and to avoid sexual intercourse during treatment.
3. Individuals with multiple sex partners should use a barrier contraceptive method (condoms) and spermicides to minimize the risk of infection.

SECTION THREE:

MICROORGANISMS CAUSING GENITAL SKIN CONDITIONS

CONDYLOMA ACUMINATA (Genital or Venereal Warts)

Microbiology

Genital and anal warts are caused by human papilloma virus, a slow-growing (9 to 12 months incubation) small DNA virus belonging to the papovavirus group, called human papilloma virus (HPV).

Clinical Features

Typical lesions present as single or multiple, soft, "cauliflower" growths which are painless and located around the anus, vulvovaginal area, penis, urethra and perineum. (The so-called "flat" condyloma of the cervix appear as "acetowhite" lesions when treated with dilute acetic acid [vinegar]. They can be seen with the naked eye or when viewed by a hand-held magnifying lens.)

Complications

1. Lesions may enlarge and produce tissue destruction.
2. In pregnancy, warts are extremely vascular, can enlarge and may cause obstruction necessitating Caesarean section for delivery.
3. HPV is closely associated with cervical cancer and may be the most common cause of this disease.

Diagnosis

A presumptive diagnosis usually is made on the basis of the typical clinical presentation. In unusual cases the diagnosis of syphilis should be excluded by obtaining a darkfield examination. Atypical or persistent lesions should be biopsied or referred to confirm the diagnosis and to exclude neoplasia.

Incubation Period

About 4 months; range is 1-20 months

Mode of Transmission

Sexual contact with infected individuals

Contagious Period

Unknown, but probably as long as visible lesions persist

Prevention

1. Avoid sexual contact with infected individuals or those suspected of having venereal warts.
2. The consistent use of condoms in individuals with multiple sex partners reduces the risk of infection.
3. Early treatment is more effective in controlling the disease and limiting its spread.
4. Avoid sexual intercourse during treatment and until follow-up examination confirms cure.

MOLLUSCUM CONTAGIOSUM

Microbiology

This mild genital skin condition is caused by the molluscum contagiosum virus, a poxvirus. This GTI is not always transmitted through sexual contact but may be spread through use of a contaminated towel and close body contact from person to person.

Clinical Features

In adults the characteristic lesions, which are small, pinkish umbilicated (punched-out) papules, are most often located on the lower abdomen, pubis, external genitalia and inner thighs. When compressed, a firm white "pearl" is expressed, usually followed by brisk bleeding.

Diagnosis

When typical lesions are present, the diagnosis is usually obvious clinically. However, for confirmation in equivocal cases, the core ("pearl") can be expressed on to a slide and examined by brightfield microscopy for classic intracytoplasmic inclusions, the so called molluscum "bodies" (see Appendix A: Direct Smears).

Incubation Period

Seven days to 6 months

Mode of Transmission

Usually by direct contact. Transmission is both sexual and nonsexual, the latter including spread via contact with contaminated clothing, etc.

Contagious Period

Unknown but probably as long as visible lesions persist

Prevention

1. Avoid physical and sexual contact with infected individuals, their belongings (especially clothing) and bedding.
2. Educate the public in the value of laundering clothing and bedding in hot water (55° C for 20 minutes) or pressing (ironing) bedding and underclothing.

PEDICULOSIS PUBIS

Microbiology

This GTI is caused by the crab louse (*Phthirus pubis*), a parasite which is 1-4 mm long with a segmented body, pointed head and claws used to cling to hairs. Lice often infest those individuals with poor hygiene, crowded living conditions and multiple sex partners.

Clinical Features

- Usually infestation is confined to the pubic hairs and around the anus. However, pubic lice also can infest the eye lashes, axilla and other hairy body parts.
- Symptoms in an individual infested with crab lice range from mild to severe itching.

Diagnosis

1. A presumptive diagnosis of pediculosis is made when a patient presents with a recent history of exposure and has itchy papules or excoriations (scratches) in the genital area.
2. The diagnosis can be confirmed by finding lice or nits attached to genital hairs and examining them microscopically (see **Appendix A: Microscopy for Lice and Scabies**).

Incubation Period

Under optimal conditions the eggs of lice hatch in a week, and sexual maturity is reached approximately 8 to 10 days after hatching.

Mode of Transmission

While other means are possible, crab lice are most frequently transmitted through sexual contact.

Remember: Lice leave a host with a fever; fever and overcrowding increase transfer from person to person.

Contagious Period

As long as lice or eggs remain alive on the infested person or in clothing.

Prevention

1. Avoid physical and sexual contact with infected individuals, their belongings (especially clothing) and bedding.
2. Educate the public in the value of laundering clothing and bedding in hot water (55°C for 20 minutes) or pressing (ironing) bedding and underclothing.

SCABIES

Microbiology

The infectious agent of this parasitic GTI is a mite, Sarcoptes scabiei, which is 0.3-0.4 mm long. The female mite on contact with human skin, can burrow beneath the surface within 2-3 minutes, leaving a characteristic track. The tiny burrows (tracks) containing the mite and eggs may appear as well-defined papules or vesicles. Typically the lesions are most prominent between the webs of the fingers.

Clinical Features

In both sexes lesions are located anywhere on the external genitalia, and in women the nipples may harbor mites. Symptoms include intense itching; this may cause excoriations (scratched areas of skin) which subsequently may become secondarily infected if hygiene is poor.

Diagnosis

1. The diagnosis often can be made on clinical grounds alone. A history of exposure to a person with scabies also helps support this diagnosis.
2. A definitive diagnosis is made by microscopic identification of the mite and its eggs, larvae or feces from a scraping of a non-excoriated lesion (see Appendix A: Microscopy for Lice and Scabies).

Incubation Period

Two to 6 weeks before onset of itching in persons without previous exposure. Persons who have been previously infested develop symptoms 1 to 4 days after re-exposure.

Mode of Transmission

Transfer of parasites is by direct skin-to-skin and sexual contact. (Transfer from undergarments or bedclothes occurs only if these have been contaminated by infected persons immediately beforehand).

Contagious Period

Until mites and eggs are destroyed by treatment, ordinarily after one or occasionally two courses of treatment a week apart.

Prevention

1. Avoid physical and sexual contact with infected individuals.
2. Educate the public on the mode of transmission.
3. Early diagnosis and treatment of patients and contacts limits spread of the infestation.

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APPENDIX C

GTI TREATMENT GUIDELINES

VAGINAL DISCHARGE (VAGINITIS)

Vaginitis: Diagnosing the cause of vaginal discharge is important because specific therapies are far more effective than so called "broad spectrum" treatments.

1. *Trichomonas Vaginalis*

There is no evidence that other 5-nitroimidazoles are superior to metronidazole, but they may be used when dictated by availability.

Recommended Regimen

- Metronidazole, 2.0 g in a single oral dose

The reported cure rate in women ranges from 82-88% but may be increased to 95% if sexual partners are treated simultaneously.

Alternative Regimen

- Metronidazole 250 mg, orally, three times daily, or 500 mg twice daily, either for 7 days.

This regimen appears less dependent on treatment of male sexual partners and is effective therapy for coincidental bacterial vaginosis.

Clients taking metronidazole should be cautioned to avoid alcohol.

Management of Sexual Partners

Asymptomatic Men

Trichomoniasis is usually asymptomatic in men, but can be an uncommon cause of symptomatic nongonococcal urethritis. Asymptomatic male partners should be treated. The 7 day multidose regimen as described above is highly effective in curing men; unfortunately, the effectiveness of the single dose regimen is less well studied.

Asymptomatic Women

Asymptomatic women with trichomoniasis should be treated with the same regimens as symptomatic women.

7.12

Nitroimidazole Resistance

Resistance to the 5-nitroimidazoles is reported with increasing frequency. Such resistance is one cause of treatment failure. When possible, one should test the metronidazole sensitivity of isolates from clients failing the repeated course. Reinfection must be carefully excluded.

Individuals not cured with initial treatment often respond favorably to repeating of the standard 7 day treatment. Individuals not cured with the repeated course of metronidazole may be treated with a regimen consisting of metronidazole 2 g orally per day accompanied by 500 mg applied intravaginally each night for 3-7 days. Vaginal preparations of metronidazole are available in many parts of the world. Where they are not, one may attempt therapy with 500 mg oral tablets, broken and inserted into the vagina.

High dose, intravenous metronidazole regimens have been used in a few refractory cases.

Pregnancy

Treatment is unsatisfactory. Metronidazole is contraindicated in the first trimester of pregnancy but if necessary may be used during the second and third trimesters. The minimum effective dose should be used. An alternative to metronidazole is:

- Clotrimazole 100 mg intravaginally each night for 7 days. This regimen relieves symptoms but cures only about one-fifth of clients. No other topical regimen has been shown superior.

Lactating women should be treated with a single 2 g oral dose of metronidazole and breast feeding interrupted for 24 hours.

2 Bacterial Vaginosis

Only symptomatic women need be treated.

Recommended Regimens

- Metronidazole 500 mg, orally, twice daily or 250 mg orally, three times daily, either administered for 7 days

OR

- Metronidazole 2 g, orally, as a single dose, with the same dose repeated in 48 hours.

A single dose of metronidazole is inadequate. Individuals taking metronidazole should be cautioned to avoid alcohol.

Pregnancy

Metronidazole is contraindicated during the first trimester but if necessary may be used during the second and third trimesters. Data on alternative regimens are very limited.

- Amoxicillin/clavulanic acid, 500 mg/125 mg orally, three times daily for seven days.
- Ampicillin, 500 mg by mouth, 4 times daily for 7 days may be used but is less effective.

Note: Clindamycin, 300 mg orally, twice daily for 7 days has been used successfully, and this regimen would be safe in pregnancy, but experience with this treatment is extremely limited.

Management of Sexual Partners

Treatment of sexual partners is controversial and may be indicated in specific instances of recurrent disease in women. Any of the above regimens may be used.

3. Vulvovaginal Candidiasis

Candidiasis in Women

Therapy generally involves topical use of any of a wide variety of imidazole (e.g., miconazole, clotrimazole, econazole, butaconazole, terconazole) or polyene (e.g., nystatin, candicidin) antifungals. The imidazoles as a group require shorter courses and appear somewhat more effective than the polyenes as a group, but they are more expensive.

Effective Regimens

- Nystatin, 100,000 - 1,000,000 units (depending on geographical area) intravaginally daily for 14 days
- Clotrimazole or miconazole, 100 mg intravaginally daily for 7 days
- Miconazole or clotrimazole, 200 mg intravaginally daily for 3 days

Oral Regimens

- Ketoconazole has been studied in a variety of oral regimens for the treatment of vulvovaginal candidiasis. Although effective, it is not recommended as primary therapy because of considerations of cost and toxicity. Relapse is not prevented by using ketoconazole.

Recurrent Disease

Reduction or elimination of predisposing factors such as antibiotic or oral contraceptive use or elimination of tight or insulating clothing, may be of value. Simultaneous treatment of a rectal focus with oral nystatin or ketoconazole is not useful in preventing recurrences. Topical treatment for 3 days in the immediate premenstrual period may prevent symptoms.

Candidiasis in Men

Recommended Regimen

- Topical application of a polyene or imidazole lotion or cream twice daily for seven days.

Vulvovaginal candidiasis and HIV Infection

Candidiasis at several sites, including the vulva and vagina, is an important correlate of HIV disease. Vulvovaginal candidiasis is often quite severe and frequently relapses. Prolonged treatment is generally required, and chronic suppressive therapy is frequently employed.

VAGINAL DISCHARGE (CERVICITIS)

GTI-related infections (mucopus) cervicitis is caused primarily by Neisseria Gonorrhoea or chlamydia trachomatis. Effective treatment is important to prevent serious sequelae including pelvic infection (PID) and subsequent infertility or increased risk of ectopic pregnancy.

1. Neisseria Gonorrhoea

In setting out these recommendations two main principles were followed: first that a significant percentage of gonococcal isolates were assumed to be resistant to penicillins, tetracyclines, and other older drugs; and second, that the antibiotics judged to be most effective are recommended first, regardless of cost or availability. Alternative therapies are then recommended to take account of cost, availability and known low levels of antibiotic resistance. **Because of the high likelihood of coinfection, concurrent antichlamydial therapy should be given as well.**

Single Dose Therapy for Uncomplicated Gonorrhoea

- Ceftriaxone, 250 mg i.m. as a single dose, or an equivalent, alternative third generation cephalosporin

OR

- Ciprofloxacin*, 500 mg as a single oral dose

OR

- Spectinomycin, 2 g i.m. as a single dose.

*Contraindicated in pregnancy, in children and in adolescents.

*There are variations in the antigonococcal activity of individual quinolones, and it is important to use only the most active.

The following regimens may be useful in some countries, depending on the prevalence of resistant gonococci.

- Kanamycin, 2.0 g i.m. as a single dose

OR

- Thiamphenicol, 2.5 g orally once daily for 21 days

OR

- Trimethoprim (80 mg)/Sulphamethoxazole (400 mg), 10 tablets once daily for 3 days

Unless chlamydia can definitely be excluded, treatment of the client and sexual partner should provide adequate coverage for both gonorrhoea and chlamydia.

Recommended Regimen

- Single dose therapy for uncomplicated gonorrhoea (as above)

plus either

- Doxycycline, 100 mg orally twice daily for 7 days

OR

- Tetracycline, 500 mg orally 4 times daily for 7 days

Alternative Regimen (for clients in whom tetracyclines are contraindicated or not tolerated)

- Single dose therapy for uncomplicated gonorrhoea (as above)

plus

- Erythromycin, 500 mg 4 times daily for 7 days

Additional Considerations

Sexual partners of those known to have gonorrhea should be examined, cultures taken (where possible) and appropriate therapy given where possible. Follow-up samples, including rectal samples for women, should be obtained for culture 4-7 days after completion of therapy. Partners should be treated with an appropriate antimicrobial regimen for both gonorrhea and chlamydial infection.

It is important that local surveillance of both *in vitro* susceptibility of gonococci and of clinical efficacy of regimens be established and monitored.

2. Chlamydia Trachomatis Infections Other Than Lymphogranuloma Venereum

Uncomplicated urethral, endocervical or rectal infections

Recommended Regimens

- Doxycycline, 100 mg by mouth, twice daily for 7 days

OR

- Tetracycline, 500 mg by mouth, 4 times daily for 7 days (Tetracyclines are contraindicated during pregnancy)

Alternative Regimens (for individuals in whom tetracyclines are contraindicated or not tolerated)

- Erythromycin, 500 mg by mouth, 4 times daily for 7 days

OR, if erythromycin is not tolerated

- Sulfisoxazole, 500 mg by mouth, 4 times daily for 10 days

Equivalent doses of other sulphonamides may be used.

Some experts feel that all antichlamydial regimens should be extended to 10 days. The addition of trimethoprim to a sulphonamide does not increase its activity against Chlamydia trachomatis.

Management of Sexual Partners

Sexual partners of individuals with C. trachomatis infection within the past 30 days should be examined and treated for C. trachomatis. If testing is not available, they should be treated with an appropriate antimicrobial regimen.

Follow-up

Because antimicrobial resistance of chlamydia to these recommended regimens has not been observed, "test of cure" is **not** necessary if treatment has been completed.

Pregnancy

Ideally, pregnant women with gonorrhea should be treated for chlamydia on the basis of diagnostic studies, but if chlamydial testing is not available, then treatment should be given because of the high likelihood of coinfection. Concurrent treatment of their male partner(s) with doxycycline or tetracycline is an important part of management.

Recommended Regimen

- Erythromycin, 500 mg by mouth, 4 times a day for 7 days.

For women who cannot tolerate this regimen, a decreased dose of 250 mg by mouth, 4 times a day for 14 days should be used.

Alternative regimen requiring further study

- Amoxicillin, 500 mg by mouth, 3 times a day for 7 days

Limited data exist for this regimen

URETHRAL DISCHARGE (URETHRITIS)

Urethritis is usually caused mainly by N. gonorrhea and/or C. trachomatis and uncommonly by Ureaplasma urealyticum. Unless gonorrhea can be definitively excluded, treatment of the client and sexual partner should provide adequate coverage for both gonorrhea and chlamydia.

Recommended Regimens

- Appropriate single dose therapy for uncomplicated gonorrhea

plus either

- Doxycycline 100 mg orally twice daily for 7 days

OR

- Tetracycline 500 mg orally 4 times daily for 7 days

Alternative Regimen (for individuals in whom tetracyclines are contraindicated or not tolerated)

- Single dose therapy for uncomplicated gonorrhea
- plus
- Erythromycin, 500 mg orally 4 times daily for 7 days

Persistent and recurrent urethritis

Recurrent urethritis may be due to failure to treat the sexual partner(s). Where symptoms persist or recur after adequate treatment of both client and partner(s) they should be referred for laboratory investigation.

PELVIC INFLAMMATORY DISEASE (PID)

All sexually active women presenting with lower abdominal pain should be carefully evaluated for the presence of salpingitis and/or endometritis. In addition, routine abdominal and pelvic examinations should be done on all women with a sexually transmitted GTI because some women with PID or endometritis will not complain of lower abdominal pain. Women with endometritis typically present with complaints of vaginal discharge and/or bleeding and have uterine tenderness on pelvic exam. Symptoms suggestive of PID include abdominal pain, dyspareunia, vaginal discharge, dysuria, onset of pain in association with menses, fever, and sometimes nausea and vomiting.

PID is difficult to diagnose because manifestations are varied. PID becomes highly probable when the above constellation of symptoms is seen in a woman with adnexal tenderness, evidence of lower genital tract infection, and cervical motion tenderness. Enlargement or induration of one or both fallopian tubes, tender pelvic mass, and direct or rebound tenderness may also be present. The individual's temperature may be elevated beyond normal in many cases. In general, clinicians should err on the side of overdiagnosis in treating milder cases.

Hospitalization of individuals with acute PID should be seriously considered when:

- the diagnosis is uncertain;
- surgical emergencies such as appendicitis and ectopic pregnancy need to be excluded;
- a pelvic abscess is suspected;
- severe illness precludes management on an outpatient basis;
- the individual is pregnant;
- the individual is unable to follow or tolerate an outpatient regimen;
- the individual has failed to respond to outpatient therapy; or
- clinical follow-up 2-3 days after the start of antibiotic treatment cannot be guaranteed.

Many experts recommend that all individuals with PID should be admitted to a hospital for treatment.

Etiological agents include N. gonorrhoea, C. trachomatis, anaerobic bacteria (Bacteroides sp and Gram-positive cocci). Facultative Gram-negative rods and Mycoplasma hominis have also been implicated. As it is impossible to differentiate among them clinically, a precise microbiological diagnosis is difficult, and treatment regimens must be effective against this broad range of pathogens. The regimens recommended below are based on this principle.

Recommended Regimen (Ambulatory Therapy)

- Single dose therapy for uncomplicated gonorrhoea
plus
- Doxycycline, 100 mg orally twice daily or tetracycline, 500 mg orally 4 times daily for 10 days
plus
- Metronidazole, 500 mg orally 3 times daily for 10 days

Alternative Regimens

- Trimethoprim (80 mg)/Sulphamethoxazole (400 mg) 10 tablets once daily for 3 days and then 2 tablets twice daily for 7-10 days
plus
- Metronidazole, 500 mg orally 3 times daily for 10 days
OR
- Kanamycin, 2.0 g i.m. as a single dose
plus
- Tetracycline, 500 mg orally 4 times daily or doxycycline 100 mg orally twice daily for 10 days
plus
- Metronidazole, 500 mg orally 3 times daily for 10 days

These regimens are based on theoretical considerations of the etiology of PID. There are few published data available.

Intrauterine Device (IUD)

Although the exact effect of removing an IUD on the response of acute salpingitis to antimicrobial therapy and on the risk of recurrent salpingitis is unknown, removal of the IUD is recommended soon after antimicrobial therapy has been initiated. When an IUD is removed, contraceptive counseling is necessary.

ACUTE EPIDIDYMO-ORCHITIS

Sexually transmitted epididymo-orchitis occurs most commonly in younger men and is associated with the presence of urethritis and the absence of underlying genitourinary pathology. It usually is present as traumatic unilateral scrotal pain or swelling.

Recommended Regimen

- Single dose therapy for uncomplicated gonorrhea
plus either
- Doxycycline, 100 mg twice daily for 7 days
OR
- Tetracycline, 500 mg 4 times daily for 7 days

Alternative Regimens

- Single dose therapy for uncomplicated gonorrhea
plus
- Erythromycin, 500 mg 4 times daily for 7 days
OR
- Trimethoprim (80 mg)/Sulphamethoxazole (400 mg) 2 tablets twice daily for 14 days

Adjuncts to Therapy

Bed rest and scrotal elevation until local inflammation and fever subside.

PROSTATITIS

There is no firm evidence to link prostatitis with STD. It is therefore not considered further.

GENTAL ULCERS

The frequency with which genital ulcers are caused by specific organisms varies dramatically in different parts of the world. Clinical differential diagnosis of genital ulcers is quite inaccurate in settings where several etiologies are common. Clinical manifestations are further altered in the presence of HIV infection. Laboratory assisted differential diagnosis is very helpful but is unfortunately not available in many areas. Several principles may apply:

- If both syphilis and chancroid are prevalent in an area, persons with genital ulcers should be treated for both conditions at the time of their initial presentation to avoid loss to follow-up

In areas of high syphilis incidence, a reactive serologic test may reflect previous infection and mislead regarding the client's present condition. By contrast, a positive darkfield examination is highly predicative of current infection. Unfortunately, microscopic tests are inaccurate in the diagnosis of chancroid and genital herpes (see Appendix B).

Concurrent infections are common. Some experts recommend that even if a specific etiologic diagnosis has been made, treatment for other locally common etiologies of genital ulcers should be given simultaneously.

1. Chancroid

Recommended Regimens

- Ceftriaxone, 250 mg i.m. as a single dose

OR

- Erythromycin, 500 mg orally 3 times daily for 7 days

OR

- Trimethoprim (80 mg)/Sulphamethoxazole (400 mg) 2 tablets twice daily for 7 days. This regimen may be less effective in some parts of the world

In clients infected with HIV, these regimens are often ineffective. Further work is required to determine optimum therapy.

Management of Lesions

No special treatment is required. Ulcerative lesions should be kept clean, and fluctuant lymph nodes (buboes) should be aspirated as required.

2. Genital Herpes Simplex Virus

There is no known cure, but the course of symptoms can be modified if oral or systemic therapy with acyclovir is started as soon as possible following the onset of symptoms.

Topical therapy with acyclovir produces only minimal shortening of the duration of symptomatic episodes and is not recommended.

First Clinical Episode

A careful clinical history should be obtained to establish that this is the client's first symptomatic episode.

Recommended Regimen

- Acyclovir, 200 mg orally 5 times daily, for 7 days

OR

For individuals requiring hospitalization because of severe disease or complications

- Acyclovir, 5 mg/kg body weight intravenously, every 8 hours for 5-7 days or until clinical resolution occurs

Such treatment can be expected to reduce the formation of new lesions, and the duration of pain, time to healing, and viral shedding. However, it seems unlikely that such treatment influences the natural history of recurrent disease.

Recurrences

Recommended Regimen

- Acyclovir, 200 mg orally, 5 times daily for 5 days

Alternative Regimen

- Acyclovir, 200 mg orally, twice daily for 5 days. This regimen has been studied less thoroughly but appears effective.

Management of Lesions

Lesions should be kept clean by washing affected sites with soap and water and drying carefully. Avoid sexual contact while lesions are present and use barrier contraceptive method after lesions are healed.

If lesions become secondarily infected, treat for 5 days with Trimethoprim (80 mg)/sulphamethoxazole (400 mg), two tablets orally twice daily.

Frequently recurring outbreaks (more than 6 per year)

Recommended Regimen

- Acyclovir, 200 mg, 3 times daily by mouth, continuously

This regimen will completely suppress symptomatic recurrences in one-half to three-quarters of sufferers, but recurrences become more likely when the regimen is used in excess of one year. Some experts recommend discontinuing acyclovir after one year of continuous use so that the recurrence rate can be reassessed. The lowest continuous dose which will suppress recurrences in an individual can be determined only empirically. Although suppressing symptomatic recurrences, acyclovir therapy does not eliminate viral shedding, and the risk of transmission to sexual partners may be increased if shedding becomes occult.

Gestational Herpes

Women with primary genital herpes near delivery put their babies at risk for neonatal herpes through vaginal delivery. Babies born to women with recurrent disease are at very low risk. Genital cultures late in pregnancy are poor predictors of shedding during delivery. Screening cultures for herpes simplex virus need not be obtained during pregnancy. Careful history and physical examination serves as a guide to the need for cesarian section in the setting of primary genital herpes. Babies born to women with active genital ulcers are positive herpes virus cultures should be isolated in the nursery, observed carefully, and cultured for HSV at 24 and 48 hours. Some experts presumptively treat all exposed infants with acyclovir.

Herpes in AIDS

Herpetic infection may be chronic and destructive in the setting of compromised immunity. Generally requiring larger doses of acyclovir for control, such infections should be managed in consultation with an expert.

3. Granuloma Inguinale (Donovanosis)

Recommended Regimen

- Trimethoprim (80 mg)/Sulphamethoxazole (400 mg), 2 tablets twice daily for 14 days

Alternative Regimen

- Tetracycline, 500 mg orally 4 times daily or doxycycline, 100 mg twice daily

PLUS

- Streptomycin* 1 g i.m. once daily for 14 days

*Where the use of streptomycin is restricted to the treatment of tuberculosis a suitable tetracycline regimen should be used alone.

4. Lymphogranuloma Venereum

Recommended Regimen

- Doxycycline, 100 mg orally twice daily for 14 days

OR

- Tetracycline, 500 mg orally 4 times daily for 14 days

Alternative Regimen

- Erythromycin, 500 mg orally 4 times daily for 14 days

OR

- Sulphadiazine, 1 g orally 4 times daily for 14 days

Other sulphonamides can be used in equivalent doses

Some cases may require longer treatment than the 14 days recommended above.

Management of Lesions

The local management of fluctuant buboes is by aspiration with a wide-bore needle every second day. A bubo is ready for aspiration when the overlying skin is shiny and the area underneath is soft. Prepare a sterile 5 ml syringe and an 18-gauge needle. Clean the skin over the bubo with an antiseptic, such as povidone iodine (PVI) or 70% ethyl alcohol, on a cotton wool swab.

Aspirate only through healthy skin to avoid fistula formation. Incision and drainage or excision of nodes will delay healing and is contraindicated. Discharge the pus into a fresh solution of 0.5% chlorine bleach to kill the bacteria. If not disposable, immediately after use flush needle and syringe 3 times (3x) with 0.5% chlorine bleach. Then, soak syringe and needle in bleach for 10 minutes to decontaminate them prior to washing.

5. Syphilis

Early Syphilis (i.e., primary, secondary, or latent syphilis of not more than 2 years' duration).

Recommended Regimens

- Benzathine penicillin G, 2.4 million units in a single session by intramuscular injection. (Because of the volume involved this dose is usually given as 2 injections at separate sites.)

OR

- Aqueous procaine penicillin G, 1.2 million units daily by intramuscular injection for 10 consecutive days

There are few data on optimal treatment of syphilis, and consequently there is considerable disagreement among experts regarding therapeutic recommendations. Some experts recommend treating secondary and latent syphilis with longer duration regimens; either

- Benzathine penicillin G, 2.4 million units by intramuscular injection once weekly for 3 consecutive weeks

OR

- Aqueous procaine penicillin G, 1.2 million units daily by intramuscular injection for 15 consecutive days

Penicillin-allergic Non-Pregnant Individuals

- Tetracycline, 500 mg orally, 4 times daily for 15 days

OR

- Doxycycline, 100 mg orally, twice daily for 15 days

Late Syphilis (i.e., late latent syphilis of more than 2 years' duration or of indeterminate duration, late benign syphilis, cardiovascular syphilis.)

Recommended Regimens

- Aqueous procaine penicillin G, 1.2 million units daily, by intramuscular injection for 20 consecutive days

OR

- Benzathine penicillin G, 2.4 million units weekly for 3 consecutive weeks. (This regimen is best avoided in cardiovascular syphilis.)

Penicillin-allergic Clients

- Tetracycline, 500 mg orally, 4 times daily for 30 days

OR

- Doxycycline, 100 mg orally, twice daily for 30 days

It should be emphasized that antibiotic treatment is less well defined for late syphilis than it is for early syphilis. In general, late syphilis requires longer therapy.

Some experts recommend consultation with a cardiologist when caring for clients with cardiovascular syphilis.

Syphilis in HIV Infection

No change in therapy for early syphilis in HIV-coinfected individuals is recommended. In all cases, careful follow-up is necessary to ensure adequacy of treatment.

Post-treatment Follow-up and Retreatment

The follow-up of clients treated for early syphilis should be based on available medical services and resources. The clinical condition of clients should be assessed and attempts made to detect reinfection during the first year after therapy. At a minimum, clients whose early syphilis was treated with appropriate doses and preparations of penicillin G should be evaluated clinically and serologically, using a non-treponemal test, after 3 months to assess the results of therapy. A second evaluation should be performed at 6 months and, if indicated by the results at 6 months, again at 12 months after therapy to reassess the condition of the client and detect possible reinfection. Individuals who are treated with antibiotics other than penicillin should be followed up more frequently.

GENITAL SKIN CONDITIONS

1. Condyloma Acuminata (Venereal Warts): Human Papilloma Virus

No treatment is completely satisfactory. In most clinical situations, podophyllin (or podophyllotoxin) or trichloroacetic acid (TCA) are used to treat external genital and perianal warts. Cryotherapy with liquid nitrogen, solid carbon dioxide, or cryoprobe is preferred when available. Cryotherapy is nontoxic, does not require anesthesia, and if used properly, does not result in scarring.

If using 20% podophyllin solution, it should be applied carefully to warts, left on for four hours and then washed off. Treatment is repeated weekly. Podophyllin should not be used during pregnancy and should not be applied to lesions on the cervix or inside the urethra. Keratinized warts on the penile shaft or perivulval skin will not respond to podophyllin; these should be treated with glacial trichloroacetic acid. Recurrences occur commonly and should be treated as above, making sure that partners are examined.

Since anal and genital warts have been linked to the development of cancer, atypical, pigmented, or persistent warts should be biopsied. All women with anogenital warts, especially cervical condyloma, should be examined annually to rule out development of cervical changes such as dysplasia.

Sexual partners should be examined for evidence of warts. Clients with anogenital warts should be made aware that they are contagious to sex partners. The use of condoms is recommended to help reduce transmission.

2. Molluscum Contagiosum Virus

Each lesion should be pricked with a needle and neat phenol applied.

3. Pediculosis Pubis

Recommended Regimens

- Gamma benzene hexachloride (1%) lotion or cream, rubbed gently but thoroughly into the infested area and adjacent hairy areas and washed off after 8 hours; (1%) shampoo, applied for 4 minutes and then thoroughly washed off. Not recommended for pregnant or lactating women.

OR

- Pyrethrins plus piperonyl butoxide: applied to the infested and adjacent hairy areas and washed off after 10 minutes.

Retreatment is indicated after 7 days if lice are found or eggs are observed at the hair-skin junction. Clothing or bed linen that may have been contaminated by the client within the past 2 days should be washed and well dried or dry cleaned.

Partners

Sexual contacts should be treated as above and examined for other sexually transmitted infections.

Special Considerations

Pediculosis of the eyelashes should be treated by the application of an occlusive ophthalmic ointment to the eyelid margins daily for 10 days to smother lice and nits. Drugs should not be applied to the eyes.

4. Scabies (Sarcoptes Scabei-amite)

Adults

Recommended Regimen

- 1% gammabenzene hexachloride lotion or cream is applied thinly to all areas of body from the neck down and washed off thoroughly after 8 hours. Not recommended for pregnant or lactating women.

Alternative Regimens

- 25% benzyl benzoate is applied to the entire body from the neck down nightly for 2 nights. Individuals may bathe before reapplying the drug and should bathe 24 hours after the final application

OR

- 10% crotamiton is applied to the entire body from the neck down nightly for 2 nights and washed off thoroughly 24 hours after the second application. An extension to 5 nights is found necessary in some geographical areas. Crotamiton has the advantage of an antipruritic action

OR

- 6% sulphur in petrolatum is applied to the entire body from the neck down nightly for 3 nights. Individuals may bathe before reapplying the drug and should bathe 24 hours after the final application.

Pregnant or Lactating Women

Treat with one of the following:

- 10% Crothamiton as above

OR

- 6% Sulphur as above

Contacts

Sexual contacts and close household contacts should be treated as above.

Special Considerations

Pruritus may persist for several weeks after adequate therapy. A single treatment after 1 week may be appropriate if there is no clinical improvement. Additional weekly treatments are warranted only if live mites can be demonstrated.

Clothing or bed linen that may have been contaminated by the client within the past 2 days should be washed and well dried or dry-cleaned.

REFERENCE

World Health Organization (1989). "STD treatment strategies," WHO/VDT/89.447, Geneva.